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ADVANCED BOOK

DESIGN AND CONSTRUCTION

CHAMBERLAIN
MURPHY

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DESIGN AND CONSTRUCTION

ARTHUR HENRY CHAMBERLAIN
NELBERT MURPHY
ALFRED GUILLOU

UNIV. OF
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INTRODUCTION

IN presenting these problems in applied design and construction, the present book attempts the difficult task of furnishing material for both teacher and pupil. For the teacher, the book is intended to be suggestive merely. No text slavishly followed will yield best results. A trained teacher, whether in design class or shop, will be able to apply the principles and problems to work suited to a particular condition or environment. Moreover, it has been the sincere desire of the authors to produce a text suitable to place in the hands of students. To the end that pupils will be compelled to work out and apply their own problems, and to prevent the deadening influence of copying, suggestive, rather than completed drawings are usually given, and dimensions are omitted. Directions, however, are sufficiently definite.

To make both design and construction as effective as possible, they must be presented, not as separate subjects, but as elements of one subject. Various materials are used and the necessity for the practice of economy kept constantly in mind.

Acknowledgement is freely made of the inspiration and assistance given by Professor Ernest A. Batchelder, whose influence may be traced through the book. Mr. R. F. Schaeffer of the Polytechnic Elementary School, Pasadena, and Mr. Douglas Donaldson of the Los Angeles High School, have aided materially in the work.

Additional books in the series will deal with the more elementary phases of design and construction, applied to problems in wood working, book binding, paper and cardboard, basketry, etc.

THE AUTHORS.

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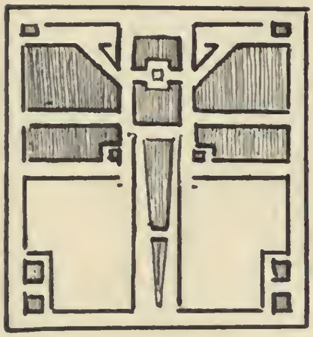
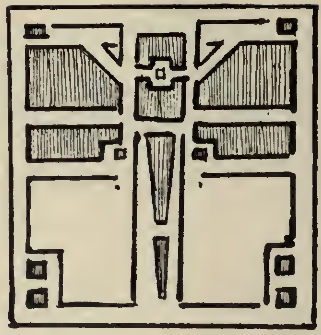


DESIGN



DESIGN applied to a lasting and useful material must represent the best work of each student. The space to be filled must be decorated in such a way that it becomes a part of the object. The strongest and best designs are the simplest. Straight line design is one of the most simple types for school work, but curved lines following the same general plan, may be used with equally good results. The unit is based on the natural form, but does not follow it closely as the problem becomes one of space filling, in which the areas of light and dark must be considered.

A border made up of a repetition of natural forms—insects or animals—does not please or attract attention. It is often a badly drawn, unbroken mass of dark and the eye has to "jump" from unit to unit as these are not connected. To make this connection through a straight line design, it is necessary to separate and square the parts of the unit (Pages 19 and 30), thus making the white paths through the dark masses and gaining light and dark areas. The dark masses may be changed to fill the confining areas. This is done most frequently in the use of the wings of insects and of plant leaves, as they are the large masses in the units. As the leaf usually makes too large a mass it may be broken at the mid rib. Lines based on the legs of insects and stems of plant forms, connect and fill spaces in an interesting way. Advantage must be taken of the natural curves and breaks in lines when working with bodies of animals, to break into the large areas, as in the elephant (page 47.)

In a border, lines should lead from unit to unit, thus making it easy for the eye to follow through the design. This may be done by making some of the horizontal spaces on the same level with and parallel to the edge of the border, or by making a path between the areas leading from unit to unit (page 31). In insect designs this movement may be accented by using the legs and feelers horizontally (page 23).

The main lines in a border are usually based on the horizontal and vertical, accenting the most important constructive lines.

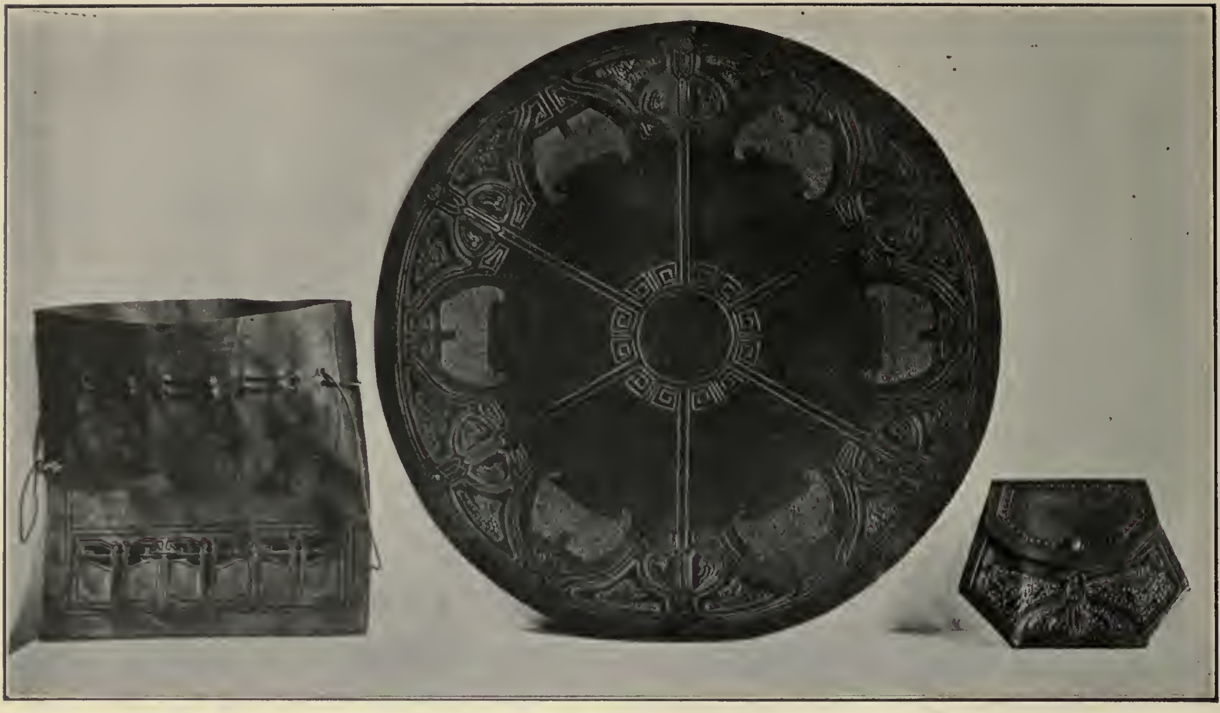
In the placing of an applied design, the margin or space around the decoration is of the greatest importance (page 13). The margin makes the design appear as a part of the object, rather than as an after-thought. In planning the design for the object try several positions, selecting the one which gives the best margins and accenting the strong constructive lines.

GENERAL DIRECTIONS FOR POTTERY

STUDY carefully good pottery forms and select the shape you wish to make. Cut a paper pattern for the size and shape using a combination of long and short curves. Unless one has become a skillful worker, the outward curves are more easily handled. For the beginner, the low bowls from four to six inches in diameter are advised. Always keep your pattern on the desk when working, to be closely followed in shaping the clay. Cut a circle of paper the size of the base of the pattern and build the base of the dish over this. Press and work the clay with the thumb and fingers until it becomes a solid, compact mass about one-half inch thick.

In building the walls use the coil method or small or large slab method. Use care that no air holes or cracks are left in the walls, as this often causes accidents in firing. The large slabs may be made about one-half inch thick and wider than 1 inch (if the use of clay be understood), and from 3 to 5 inches long. Cut smooth the edge that will fasten to the base. Then cross this edge with lines to make it stick to the base. Set the slab on top of the base, with the outer side of the slab meeting the outer edge of the base. Work together by pressing the roughened edge into the top of the base, being sure it sticks inside as well as on the outer surfaces. If the edges are wet slightly they adhere more easily.

Fit in as many slabs as necessary to complete the circle, pressing the seams carefully together. The walls may be stretched into the shape of the pattern as the building progresses, by slowly pressing and stretching, or shrinking the clay. The shrinking is done by pressing the clay together and overlapping it, by working or sliding the hands toward one another. Keep the clay surface wet while working on it. To produce walls of even thickness, keep the thumb inside and the fingers outside and work the thick into the thin places. Keep the walls about one-half inch thick, as in the finishing it is cut thinner. Cracks may be mended by forcing water into them and pressing the clay together again. Use a wooden clay tool to help smooth the surfaces and cut off the high places. Hold the piece of pottery on the eye level and slowly turn in the hands comparing the sides. Trim off the high places or fill in the low ones. Between lessons keep the piece in a damp cloth. When finished dry slowly and thoroughly before firing.



Leather Work

LEATHER

THE beauty of leather work lies in a well-thought-out design, properly adapted to the object made; in beautiful tooling, good color, and last but very important, the making up.

First draw an accurate paper pattern of the object to be made and cut it out. Then fold the pattern from top to bottom and from side to side, to be sure all opposite sides are alike. Draw on the pattern the size of the space to be occupied by the design. When a satisfactory design is secured, make a tracing of the pattern shape and the design in its place, that all the lines may be traced on the leather at the same time. Cut the leather one-half inch larger than the pattern to give room to thumb-tack the tracing in place, keeping the lead lines away from the leather. Use no transfer paper. The design is transfered to the leather by the pressure of the tracing tool, or a blunt narrow point, or lead pencil. Use a rule in tracing all straight lines, as a badly drawn line is difficult to correct. Always keep the leather damp when tracing or tooling, but do not wet it through the entire thickness, as that makes it spongy.

TOOLING

When the leather is pressed lower than the natural surface to an even dark tone, it is called burnishing. To burnish a space begin in the center working outward to the enclosing lines, tooling lightly and evenly. Work the loose surface of the leather to the space which is left high. This can be gone over and over until it becomes an even brown tone. It is often simpler to burnish the design than the background, as the spaces are smaller. Another simple and quick way is to press down as little of the background leather as possible, making the pressure deeper next to the design. Stem lines may be deepened by burnishing; or raised, by burnishing a slanting surface or bevel each side of the line. This leaves the stem high. This raised line may be made very narrow and even by gradually working the burnishing in closer toward the raised line.

COLOR

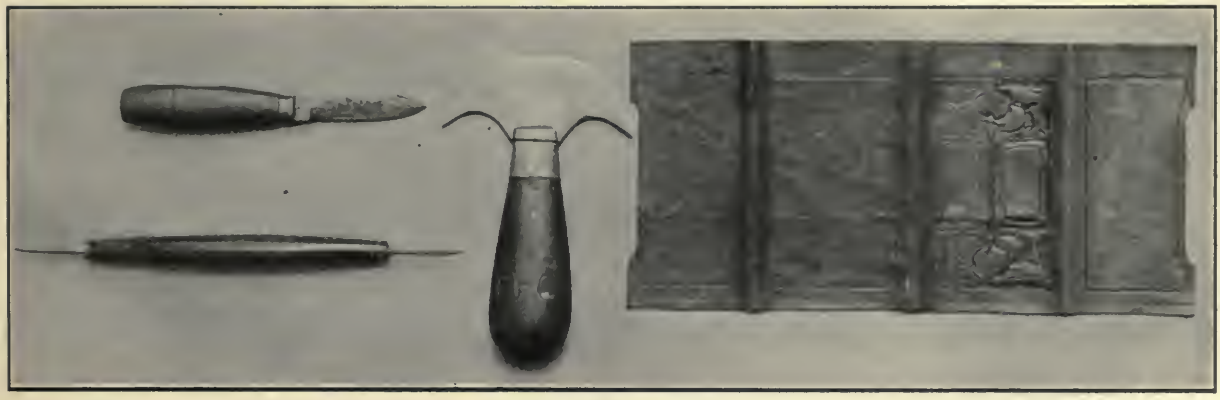
To simplify the coloring of the leather, skins in good tones of green and brown may be used. These need no added color. The light tan calf takes dye very readily. Use diamond dye prepared for wool. To one package of dye use one pint of hot water, bringing it to the boiling point, and put in jars. This is a strong color and may be made lighter by adding water. In small dishes mix the dye as in watercolor until a satisfactory color is obtained. Try colors on scraps of leather, as the yellow tone of the leather will change the color of the dyes. Dampen the surface of the leather as this opens the pores in the skin and the color will take more evenly. Use a small watercolor brush for the small spaces and paint first the spaces to be kept light. Paint next the stems, leaves, and background. A large brush or cloth pad may be used for the larger background spaces. The green is easily softened by washing brown over it. The different colors may be painted over one another to soften and blend them. Use a small cloth pad to rub the colors evenly over the surface as quickly as possible. Should a mistake occur, scrub the color off with soap and water, using a nail brush, and dye again. The scrubbing will not harm the leather if the tooling is set deeply. Always work for soft, low-toned colors. Thin brown usually softens the colors and blends them.

THE MAKE UP

Do not trim the edges of the leather until the sewing is finished, as the double edges can then be cut alike. Glue together the edges to be sewed, or sew around the edge with needle and thread. To test if the parts are even and true, press a needle through the outlines of the pieces to be sewed together. Have the sewing lines well marked and even. The outlines of the pattern are usually used for sewing lines. Sew on any lock stitch machine, using heavy silk or button-hole twist. At the beginning and end of the stitching, leave threads about four inches long to be sewed in between the two thicknesses of leather. Use a needle to sew each thread through the nearest stitch and into the pocket to be tied inside or glued. This prevents frayed ends of threads. Trim the leather as near the stitching as possible and dye the trimmed edges.

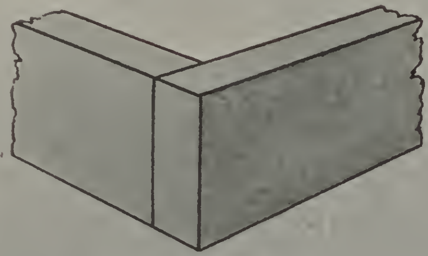
TOOLS

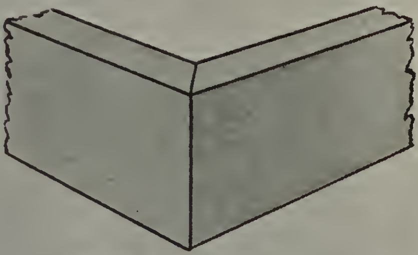
In the illustration below is shown the round-bladed saddlers' knife. This is used to pare and trim the leather. The straight-bladed or ordinary sloyd knife, is usually found wherever manual training is given. This is used in many ways. The pointed tool with the wooden handle is the tracing tool. The round-end tool at the left in the same handle is the burnisher.

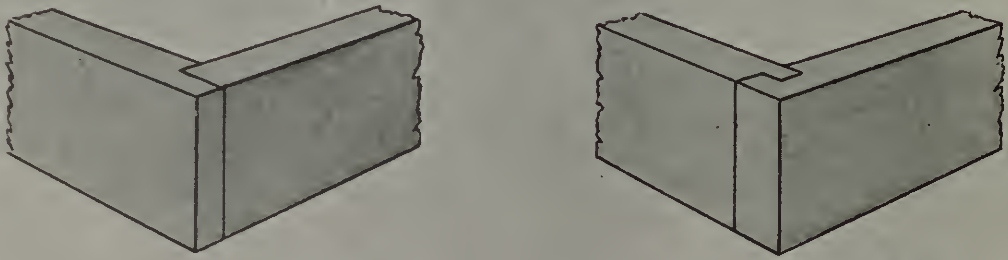


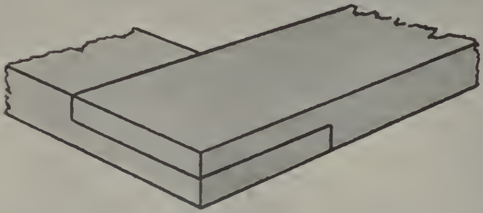
Leather-Working Tools

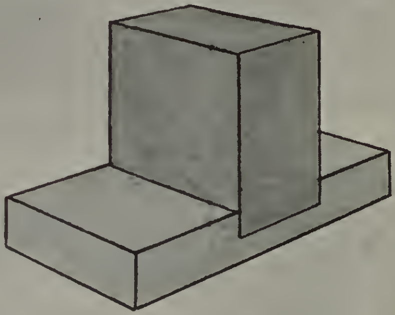
Joints

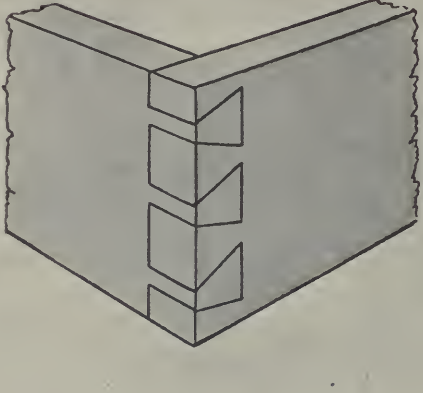

Butt Joint

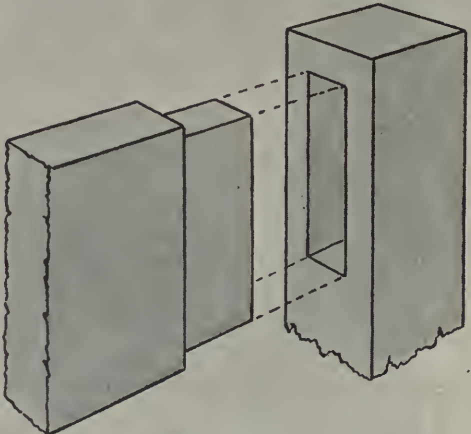

Mitre Joint


Rabbeted Joints


Half lap
or
Middle lap


Gained or Housed


Dovetail Joint


Mortise and Tenon

GENERAL DIRECTIONS FOR WOOD

Joints

IN the making of all joints a careful laying out of the work is necessary. To draw the joint accurately on the wood is quite as important as is careful sawing and planing. Unless correctly drawn, your joint will not fit when cut.

BUTT JOINT OR BUTTING JOINT

In this joint the two surfaces are simply placed one against the other and held there, sometimes by glue but generally with nails or brads. In ordinary carpenter work, house framing and the like, butt joints are generally used. In making this joint the wood must be squared on two adjoining faces, or as we say, face and edge, to make the joint true both ways. In sawing, work close to both lines of the marking. This leaves less work for the block plane when truing up. To fasten the butt true to the other piece, square across this piece and nail to this line as a guide. When the joints are securely fastened, trim off the ends.

RABBETED JOINT

The rabbeted joint is similar to the butt joint, except that a groove or rabbet is cut into one piece. Either the other piece or a projection cut on it, is to fit into this groove. These rabbeted joints must be carefully laid out and cut. Always square on two adjoining faces.

HALF LAP JOINT

In laying out the half-lap joint, set the gauge to half the thickness of the material. With the try square, square across the broad faces and down on both narrow faces or edges. Then scratch with the gauge around both narrow faces and the end. Saw in with the cross-cut saw along the square marks to the gauge scratches. Then turn the work upright in the vise, and with a rip saw cut down along the gauge marks. Do not saw on the marks, but inside of them, so that the saw kerf just touches the lines. Always use the saw to cut this joint. A broad chisel may be used if the saw leaves the surface uneven. In laying out this joint, the ends may project slightly. Trim them off when the work is completed.

When this joint is used in the lapping of two pieces and not at the ends, it is laid off with the square at both sides and is gauged for the depth. After sawing to the gauge lines, it must be cut out with a chisel. Do not try to chisel straight through, but cut from each side out toward the broad surface, until the edges are accurate. Then place the work flat and cut away the center.

MITRE JOINT

Mitre means halved. A mitre joint is one in which the angle between the pieces is halved, and a half cut in each piece. The mitre cut should be laid off on the proper face and the adjacent face squared with a line to guide the saw cut. Mitres for the more common angles,—right angle, hexagon angle, octagon angle—are best laid off with the steel square.

Select equal numbers on the arms of the square—5 and 5, 8 and 8, etc.

RIGHT ANGLE MITRE

Any two equal numbers will do. Lay these on the edge of the wood. The arms of the square give mitres in opposite directions.

HEXAGON MITRE

With any convenient number of inches, place the square on the edge of the wood as before. Mark both ends of the measure. Take one half this distance on the short arm of the square and lay it on one end of the edge distance. Swing the square, keeping the short arm number in its place until the long arm edge touches the other end of the edge distance. A scratch along the short arm gives the hexagon mitre.

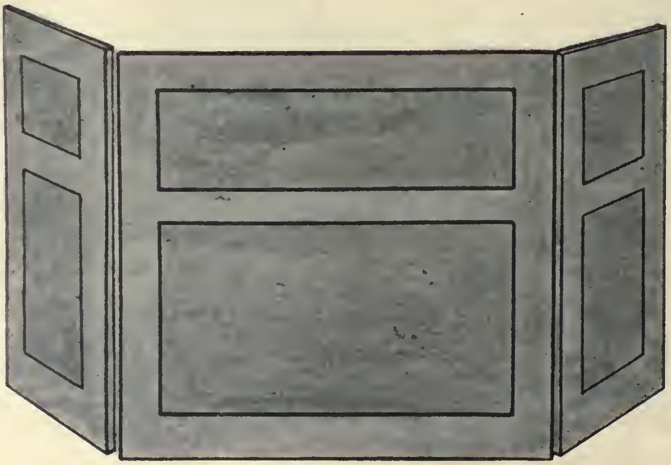
THE OCTAGON MITRE

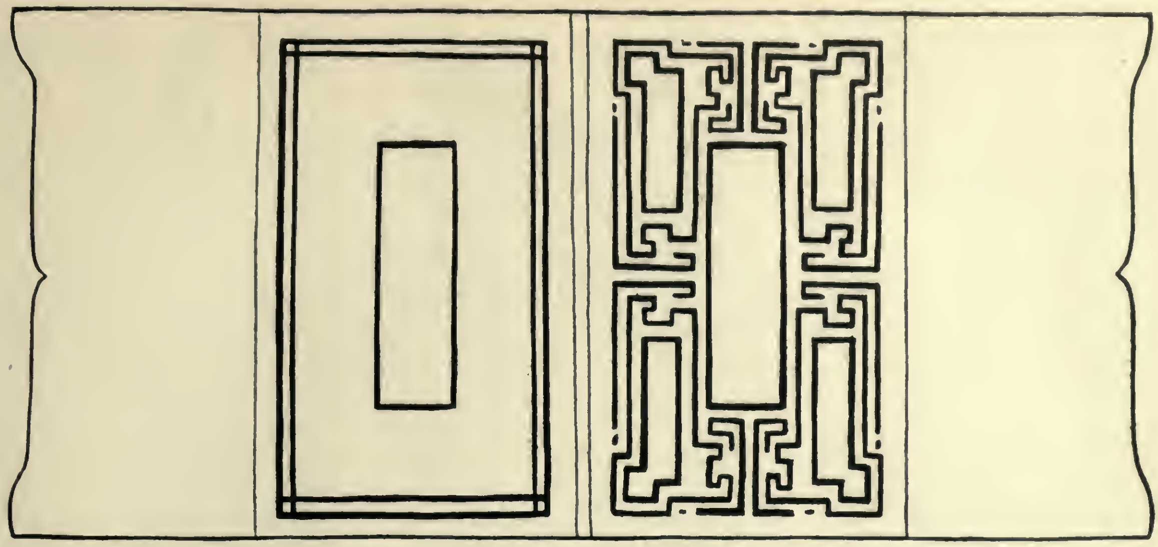
On the straight edge of a clean board or piece of cardboard, lay off with the square a right angle mitre. The large angle outside of this mitre angle is the octagon angle. To mitre this angle set one point of the dividers anywhere in one side of the angle and the other point at the toe of the angle. Now swing a semi-circle around the first point. With the spacing on your dividers as before, do the same with the other side of the angle. These semi-circles will cut each other twice,—once at the angle and once between the sides. Draw a line through these intersections, and this line will mitre the octagon angle.

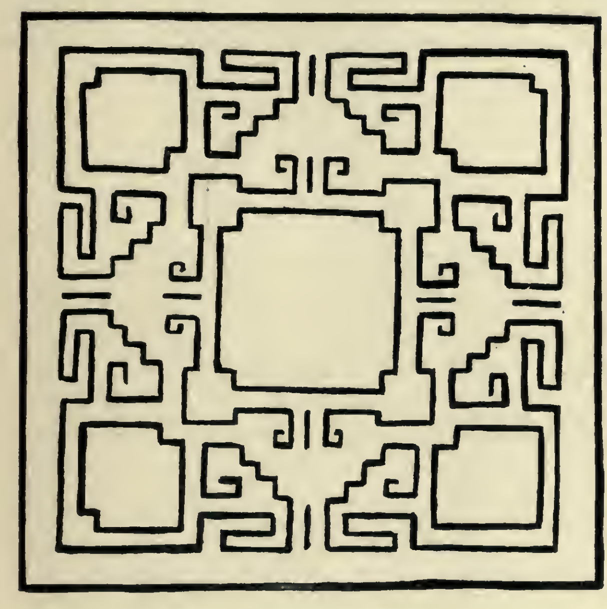
MORTISE AND TENON

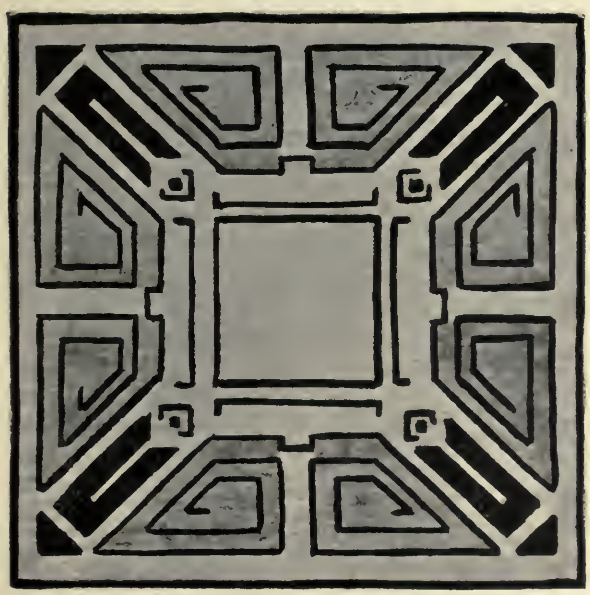
This is the common furniture joint and is used for strength. The hole is called the **mortise** and the peg the **tenon.** The timber should be selected with reference to the grain, so that beauty, strength, and ease in working will be secured. In laying out, square the tenon shoulders completely around the wood. This shoulder **butts** against the other piece and makes the joint square and firm. Scratch both the tenon and mortise with a mortising gauge, set to a chisel width. —⅜ inch and ½ inch are the more common widths. When a single gauge is used, work from the face side.

In cutting the mortise use a chisel of the width of the scratch and cut only across the grain. Unless the wood is very slivery or the grain very crooked, it is not necessary to cut the scratch lines. Cut the mortise down about ¼ inch, and with a bit the size of the chisel, bore out the mortise, making the holes as close together as possible. Use a **bit gauge** clamped on the bit to control the depth. Trim the mortise out with the chisel, being careful not to widen it outside the gauge scratches, and to make the sides at right angles with the surface of the wood. Cut the tenon shoulder with a cross-cut saw, following around from one face to the next, thus keeping the shoulder edge continuous. Turn the **work** on end in the vise and cut the tenon with a rip-saw. Cut **outside** the gauge scratches, so that the saw kerf will just touch the lines. It is easier and quicker to saw to the line than to chisel out afterward. The tenon should fit the mortise so firmly that the pieces can be handled without dropping apart. An **open** mortise is one that goes through the piece. A **blind** or slub mortise does not go through nor show on the opposite side.







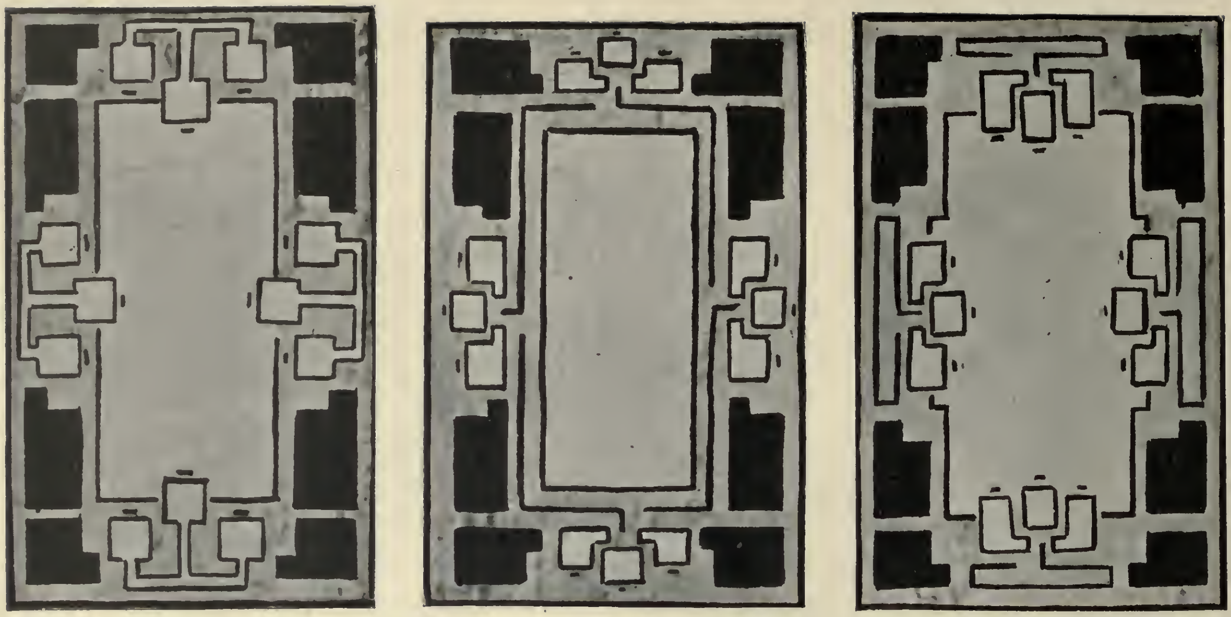


LINE DESIGN

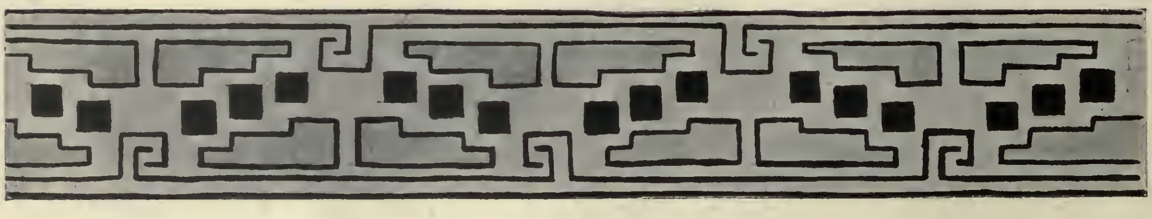
THIS problem develops a balance of light and dark using straight lines as a motif and massing them to give a dark surface at the sides of the space to be decorated. An open, light space is secured by forming an enclosure or area in the corners. Compare the two designs and notice that the lines forming the mass of dark are more compact in the leather design, than in the clay tile. The leather is easily tooled and does not break into the background as does the incised lines of the clay. Keep in mind the nature of the material to which the design is applied. In tooling a line design on leather, the lines may be pressed or burnished very deeply and as wide open as the tool will make them. Burnish over and over until they are clear and well set.

Incise the lines on the tile and lower the areas.

Notice how the wings in the insect on the tile are made up of lines which are deeply incised. Keep the parts of the body as simple as possible when several lines are combined with them.



Three Arrangements of a Berry Design



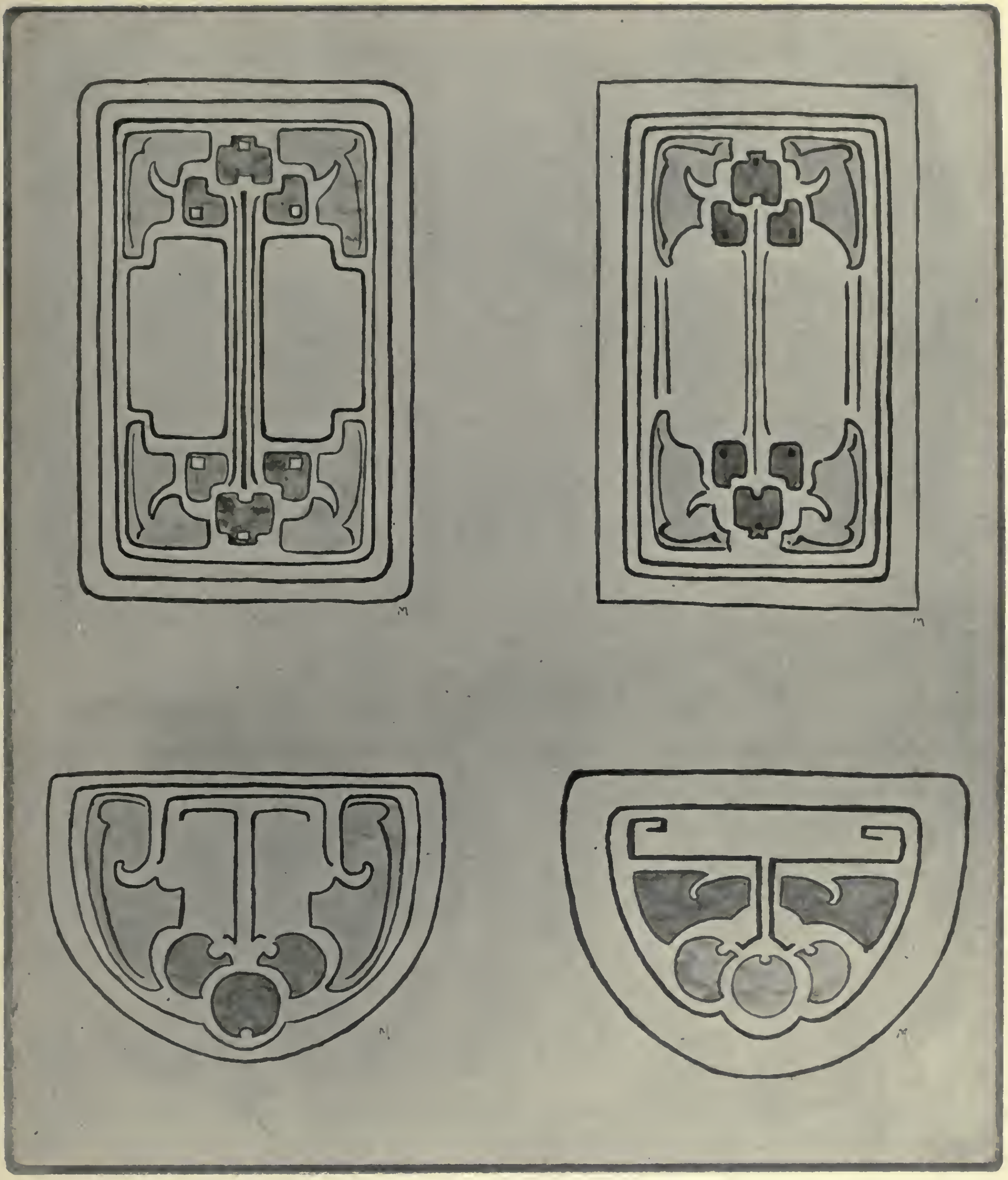
Berries Arranged in a Border Design

THE squared berry and leaf problem is presented and developed in the preceding book. As these designs are made for leather, each space is simple in shape, the berries and leaves carefully massed and broken, to give good background spaces. The background spaces are kept smaller than the shapes occupied by the design, making it possible to burnish the entire background surface, leaving the design high. The open central space would be left the natural leather.

Notice the simple changes in the arrangement of the berries, stems and leaves for each card case design. In each, the berries are grouped together closely to form a light space and the natural leaf form is lost in making a shape that will fill the space. As the unit is repeated so many times on the belt, tool the smaller spaces and burnish the stem lines very deeply and wide open.

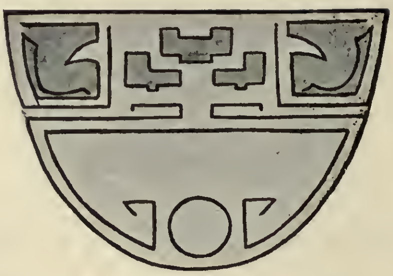
The following colors are suggested to dye the leather: berries, orange; background, brown; leaves and stems, dull green. Wash the brown background over the leaves. This will help to blend the colors. Dye the berries first, keeping them clear if you wish the color very bright.

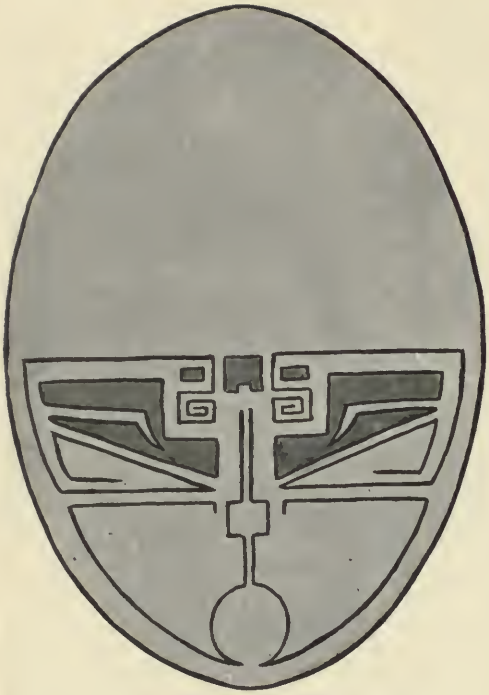
CARD CASE AND PURSE DESIGNS

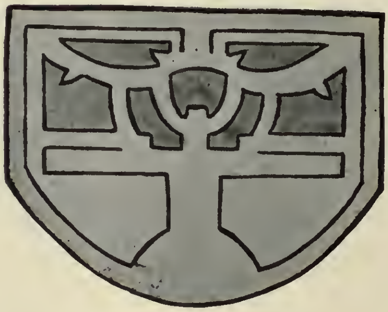


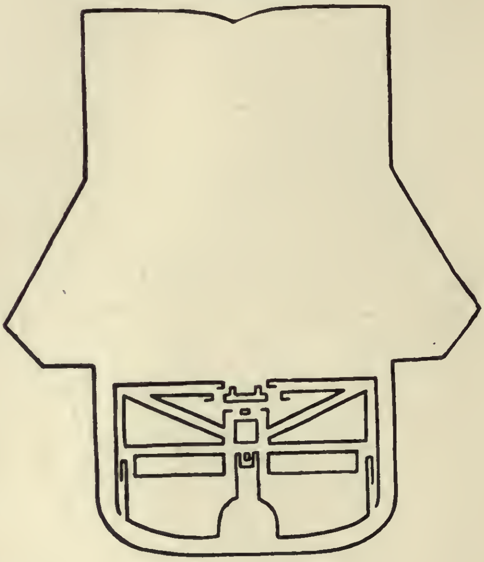
THE general plan for these designs is the same as when straight lines are used. The berries are massed together and the leaves fill the corners. The curved lines in the purse design follow the curve of the outside construction and the button forms the lower berry. The other two berries are curved to fit around the button and placed near enough to keep them in a mass. The button and berries may be the same color in the tooled leather.

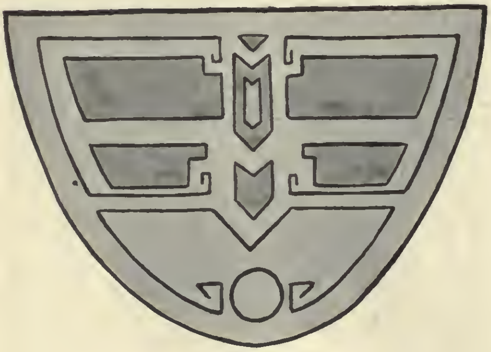
STUDENTS' DESIGNS

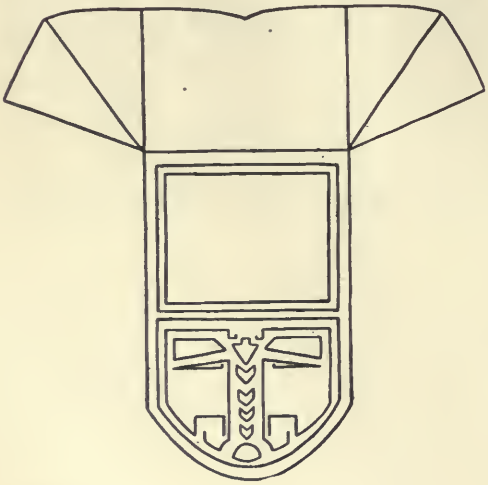




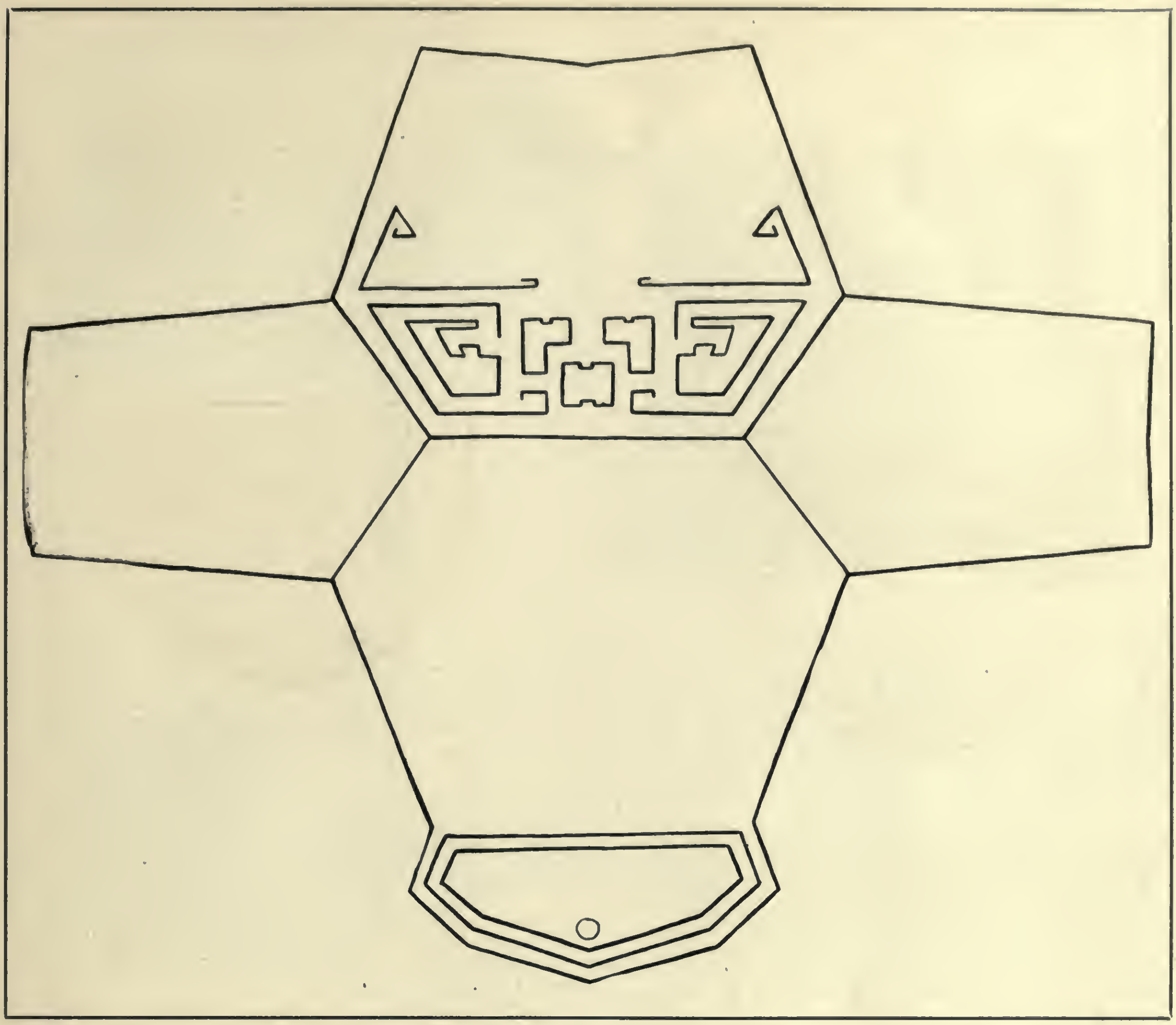








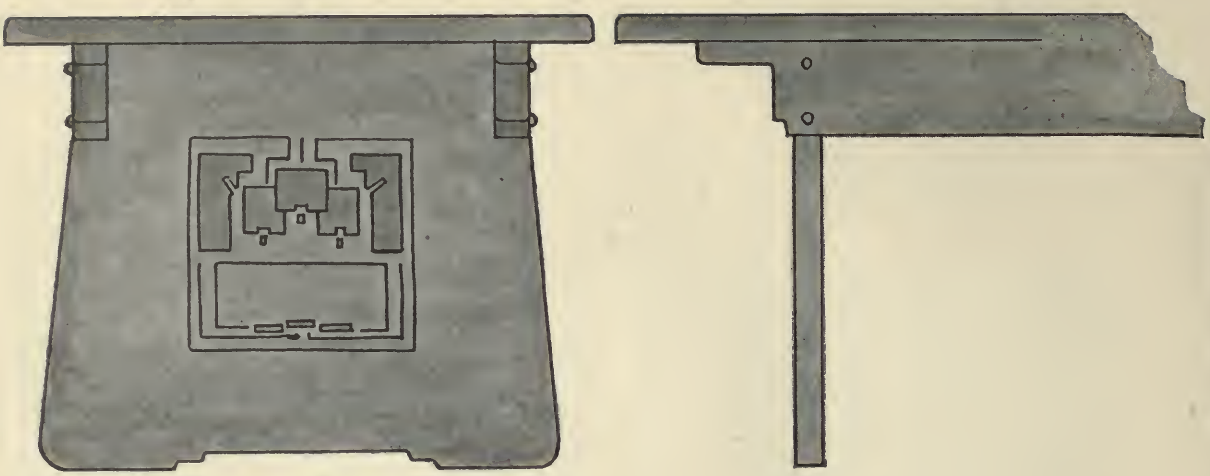
THE designs for the purses are made by seventh and eighth grade students, and in each instance the design is placed on the button lap of the purse, a space being planned for the button. The three upper purses have the pockets sewed on and the decorated surface buttons over this pocket. The two lower ones have the pocket cut on them with a fan gusset to fold in at the sides and give more room to open the pocket. Make a pattern, and be sure that in every case, the opposite sides are equal, before fitting designs. Make several abstract designs before trying to apply one to your space.



HAND BAG PATTERN

THE cut shows a carefully drawn bag pattern with the front and back of the bag the same size. The button lap fastens above the design and the two gussets fold double in the center and fit between the front and back. The gussets are sewed to the sides of the bag and must fit accurately. The handle may be sewed to the back or at the top. The applied design is made by an eighth-grade student.

FOOT STOOL

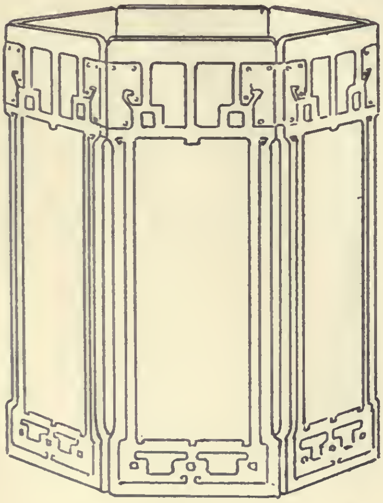


THIS is a simple stool, easily constructed and requires little material. Size of stool and thickness of pieces may be left to individual taste and needs. The interesting feature in the construction is the nice relation of its different parts. As shown in the side elevation, the projecting ends of the inset side pieces serve two purposes. By screwing through these from underneath, the top of the stool may be securely fastened. They also lend the appearance of support to the long projecting top. This adds stability to the design.

In the end view the cut-out space at the bottom has the same character as the ends of the inset sides. This lengthened cut gives a long horizontal line which is a characteristic of this long, low stool. Note that the side pieces are set in flush with the edges. Before shaping the ends of the stool, and while the faces are rectangular, lay out the spaces to be cut, square with the working edge.

In applying the design, let the design enclosure be suggested by some constructive element. The drawing shows the inset side pieces to have determined the height of the design enclosure. The lengthened cut at the base has determined the width.

WASTE BOX

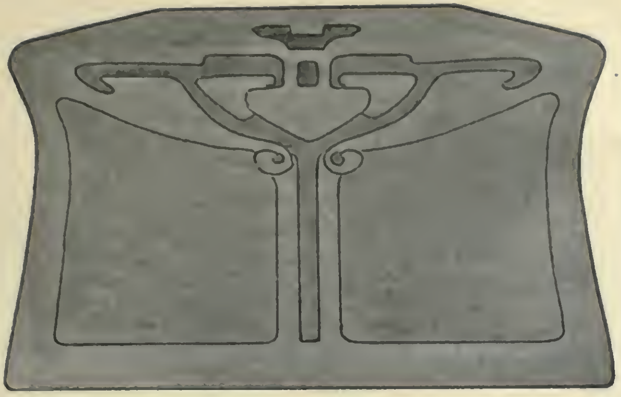


WASTE BOX
SCALE - ¼" = 1"

CONSTRUCT a hexagon base of the size desired for the box. The six sides are fastened to the base with round head, blued or brass screws. The corners are fastened at the top with pieces of thin copper and riveted on with copper tacks.

In applying decoration to a piece of work, the design must be thought out with the construction. Notice how the metal corner pieces enter the scheme of the upper veined border. The screws also in the lower border are given some degree of prominence. The chamfered edges between the two borders give a feeling of lightness.

To complete the decoration, the enclosed spaces of the design are easily brought out with a dye of contrasting color or a darker shade of the background color. The small squares have been slightly cut out or lowered, and these may be brushed in with bright colored paint. The long vertical lines may also be filled in with bright color. A good material is the dry paint mixed with turpentine and linseed oil.



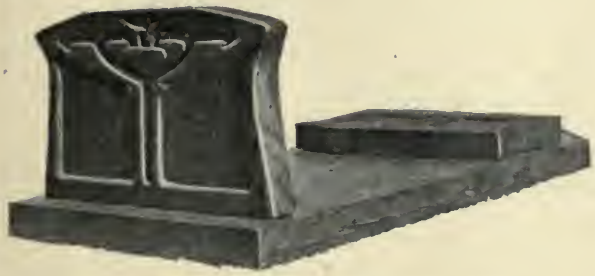
Design for Book Rack End

BOOK RACK

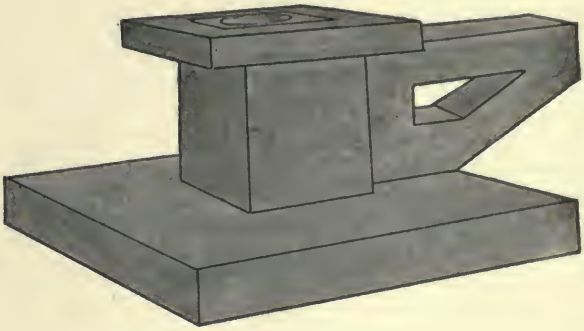
AND

TRAY

THE photographs show fairly simple designs in relief carving. An effort was made to keep the surface as flat as possible and to break away from the ornate high relief carving. This form of carving is not only more decorative, but much easier for the eighth grade students to execute.

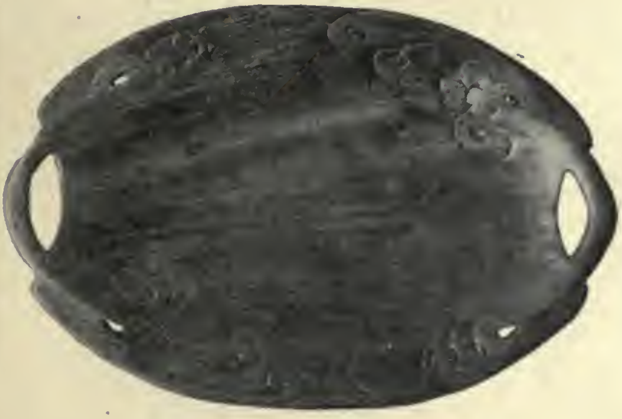


Low Relief Carving of the Above Design

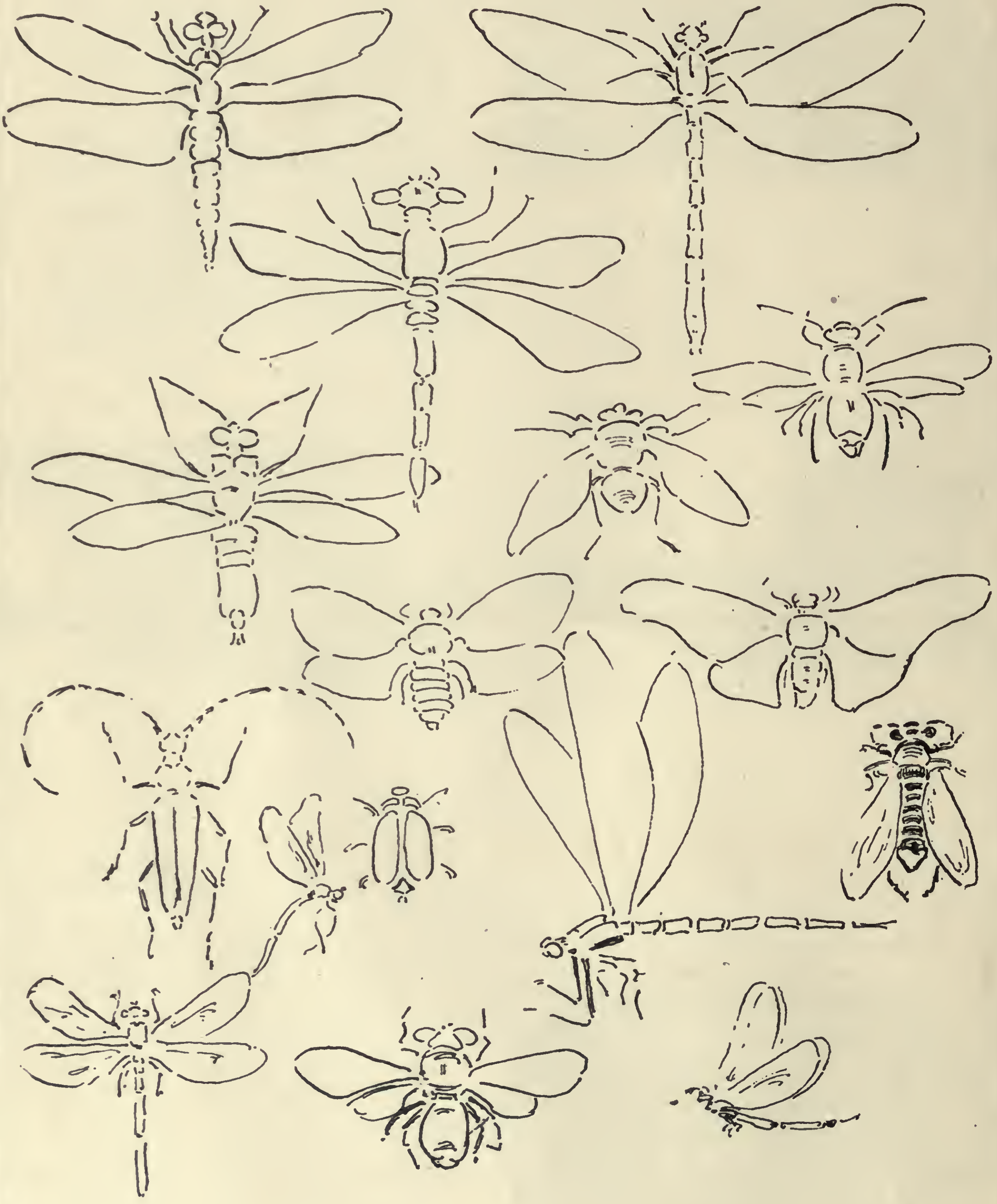


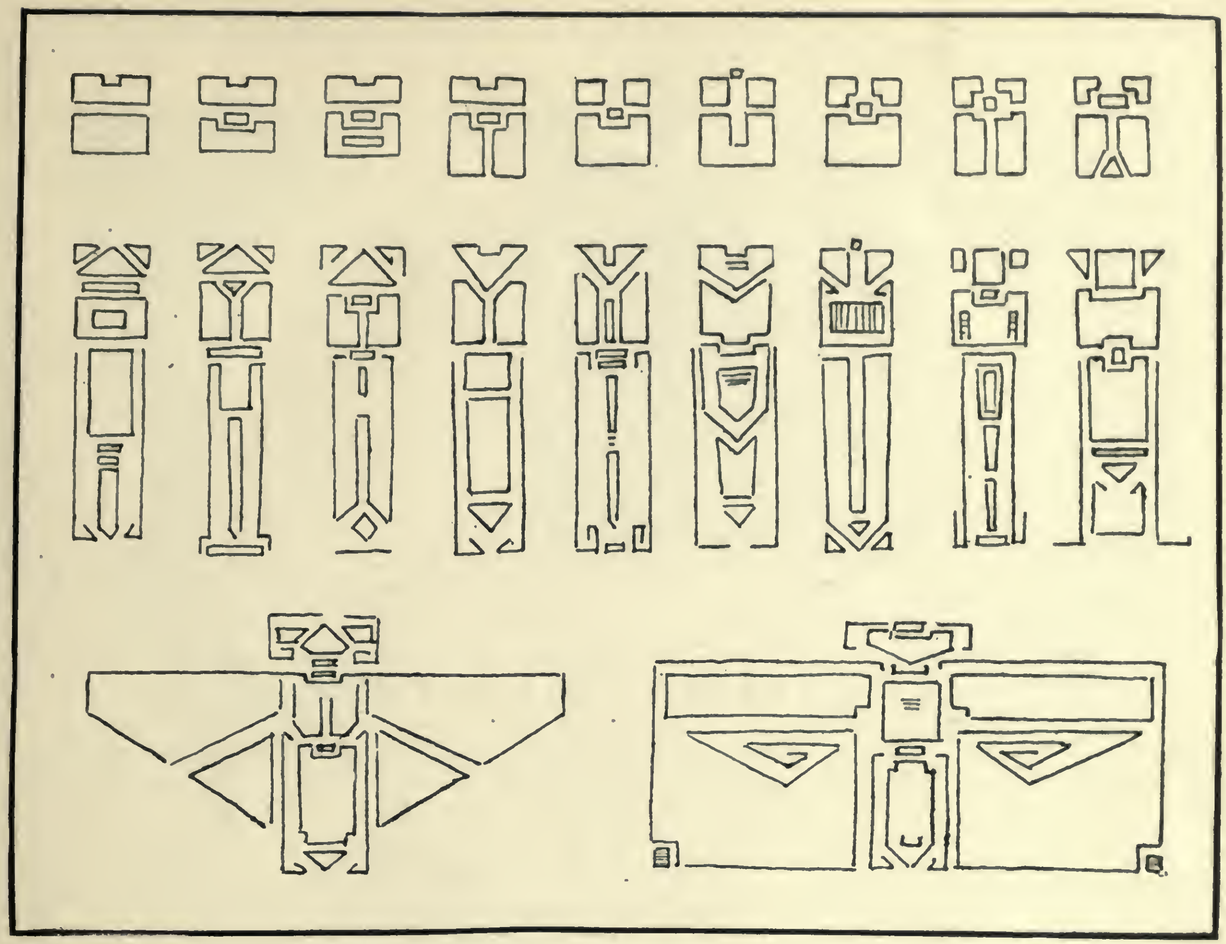
CANDLESTICK

THE square standard may be joined to the base by a mortise and tenon joint, the mortise cut in the base to a depth of three-eighths of an inch. The top may be fitted to the standard by the use of dowel pins, one on each corner. Use a one-fourth inch pin, set into the standard three-eighths of an inch, and glue. The pins should be set into the top piece one-fourth inch. Dowel the handle, and glue top, bottom and handle to the standard. After boring the hole for the candle, cut a piece of copper and let it in flush with the top as shown.



Carved in Low Relief.

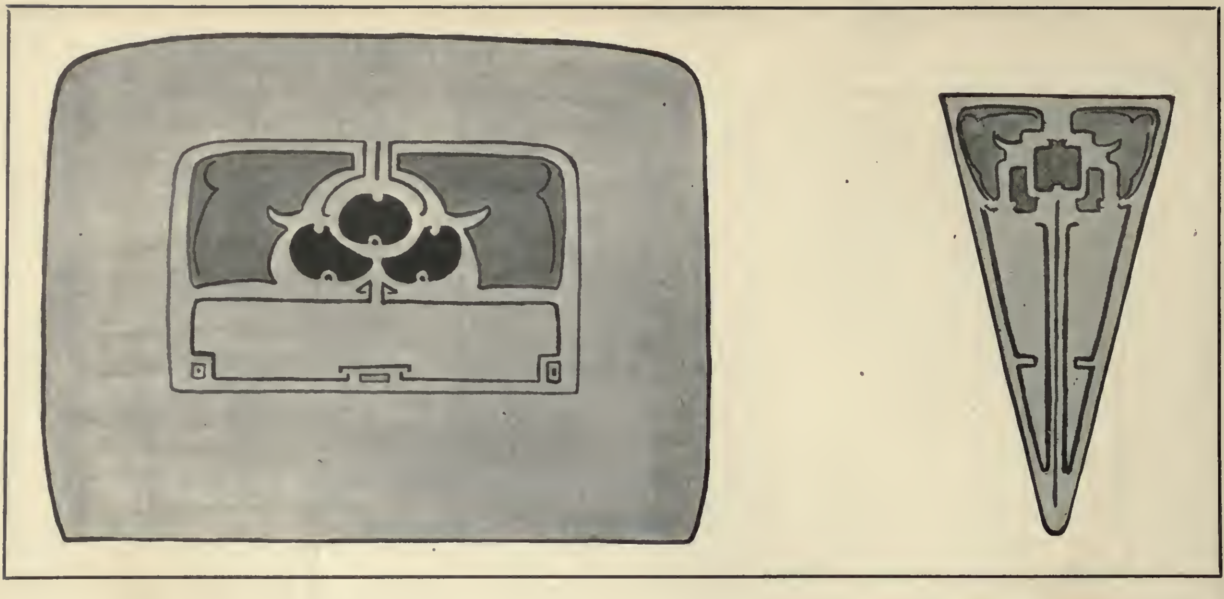




DESIGN FROM THE INSECT

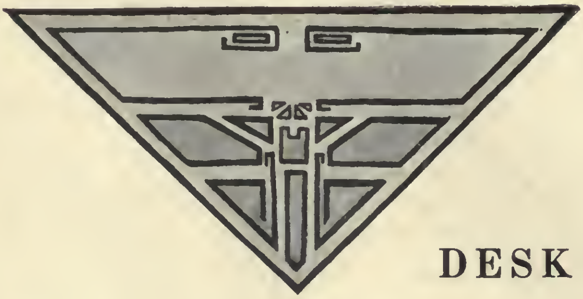
TRACE an insect from page 18. Pin this over the squared paper, letting the body and general direction of the wings cover the lines of the squared paper. As the two sides of this unit must balance, choose that half of the insect drawing which offers the most possibilities, and square each part.

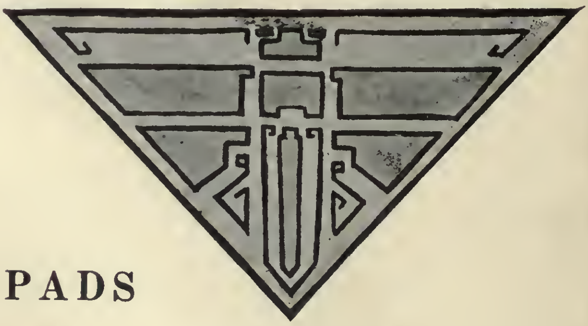
In separating the parts of the unit that the background may form the light spaces, keep the parts parallel at the point of separation and sufficiently near to indicate they belong to one another. In a two or three-inch border these paths are about one-eighth of an inch wide. The design is preferable if large and small spaces are planned in making the body. Here are shown several ways of using the body, legs and feelers. The wings and feelers form long, horizontal lines and spaces which will carry the eye through the design when repeated in a border. The added lines at the base connect and help tie the units. Make several units and select the simplest, repeating it three or four times. If the spaces between the units are too large or too small the effect of the design is often ruined.



PROBLEMS IN LEATHER

TO utilize some of the many scraps left in cutting leather, the scissors case is suggested. It takes the berry and leaf design or line design very nicely. The berry and leaf design for the book end shows a compact arrangement of the berries in curved lines, also slightly curved lines in the leaves. Notice how the mid ribs of the leaves are made use of in breaking into a large space. The large open area below the design, formed by the lines, balances the mass of light and dark above. The design space is placed a little above the center and each margin is carefully considered, the lower margin being the wider. After tooling and coloring, the leather is cut three-fourths of an inch larger than the tin lining. It is fastened to the tin with glue. Adjust the leather properly. The inside may be lined with an ooze or light weight leather. Holes are punched with a common harness punch, near together and as close to the tin as possible. Then trim off any extra leather and lace with a leather thong. This laces the outside and lining together.

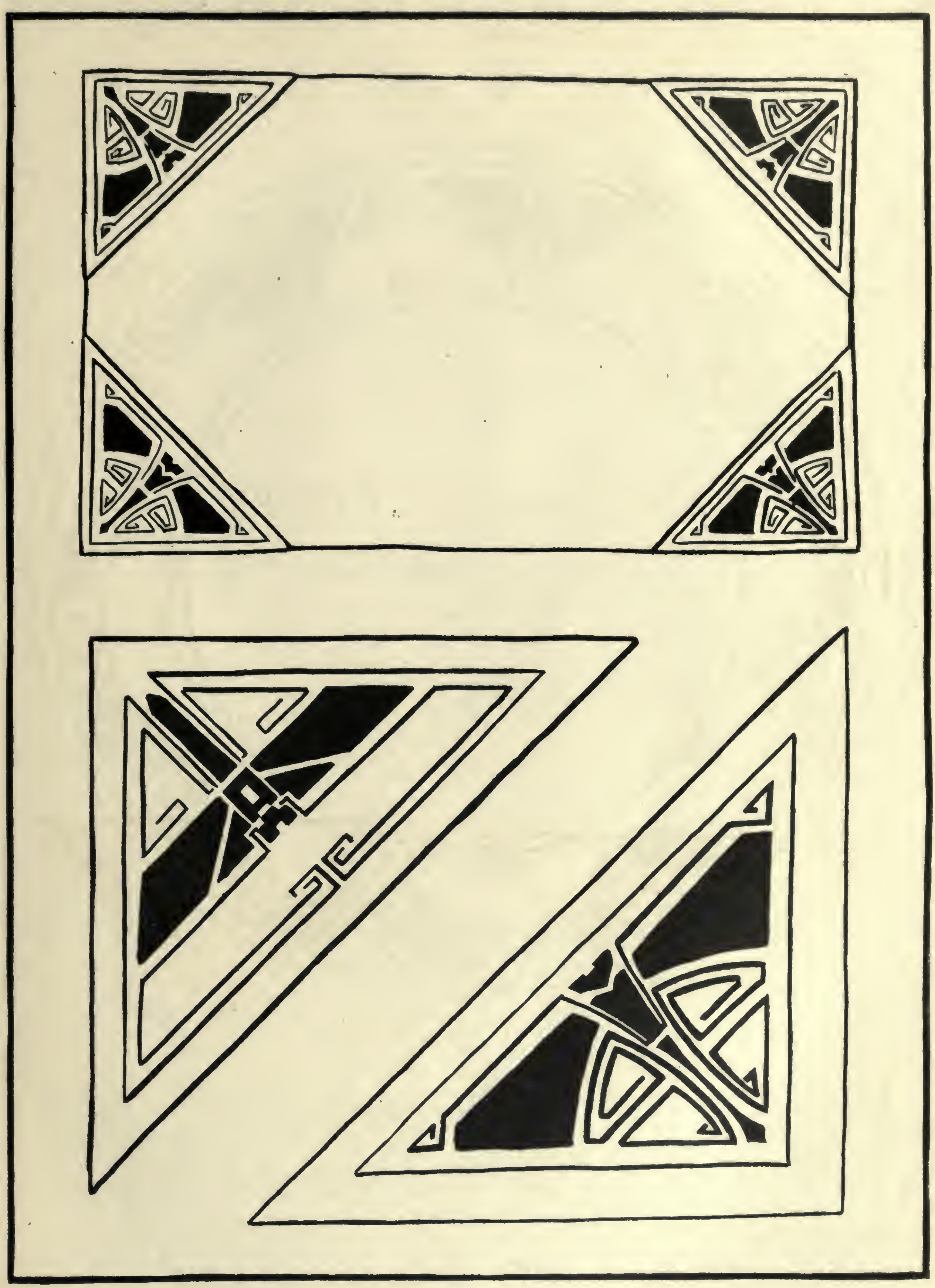




DESK PADS

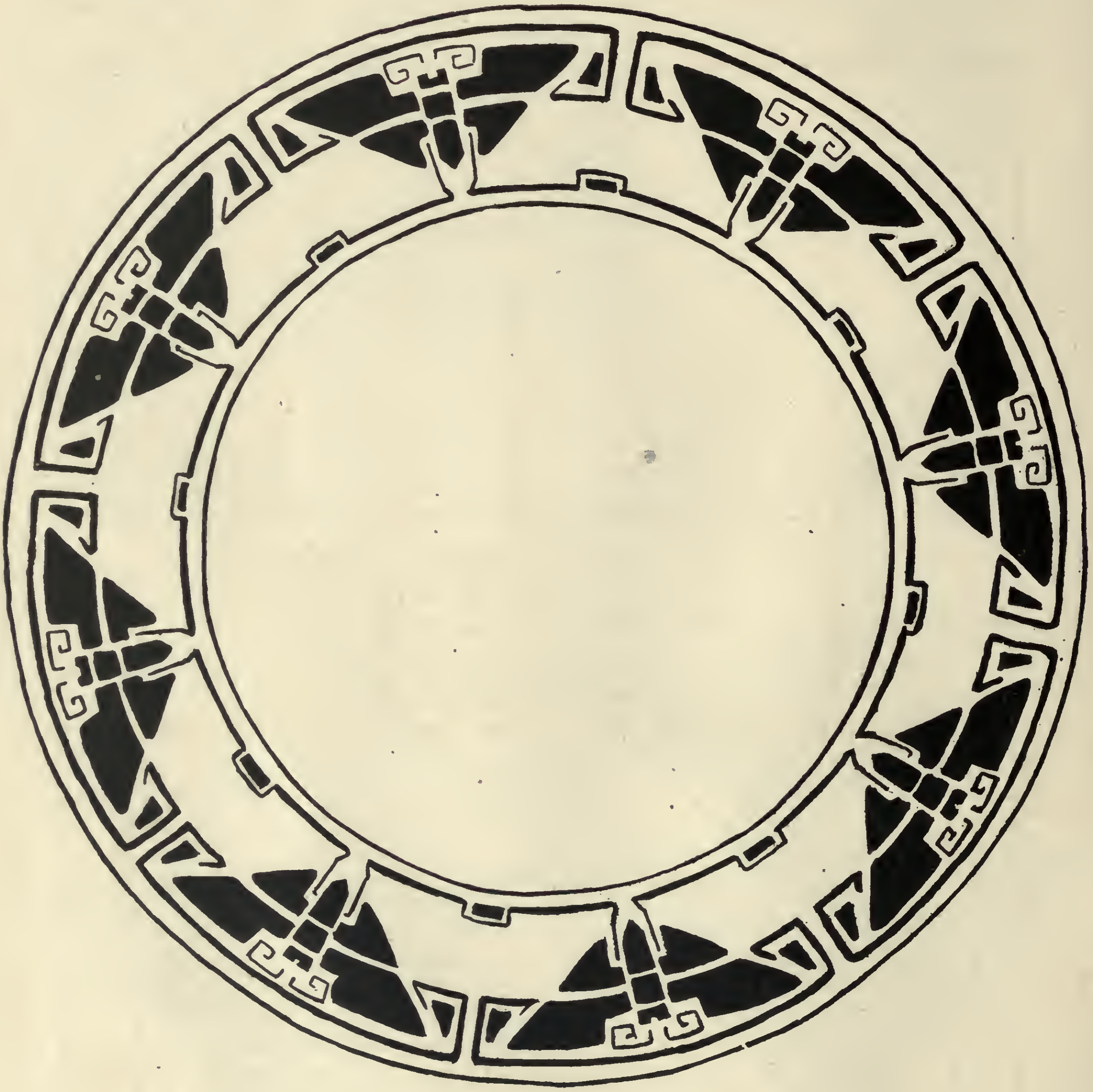
THE blotter pad may be made in two ways. Cover the trunk-board, or tin foundation, with a linen cover and sew the corners in place. This leaves the raw edge of the leather at the corners. Or again, work out a pattern which is to fit around the board, allowing for thickness of the board and an underlap of about three-fourths of an inch, to glue to the bottom of the board. Try this pattern over the board and when it fits, cut the leather by it. Bind the edges of the board with a narrow strip of cover paper or lining leather. Then glue the cover paper or leather **top** lining to the board covering the raw edges of the binding. Glue the corners in place, putting the glue on the underlaps, which are glued to the bottom of the board. Hold the corners in place until set, and dry under a press. Then glue the cover-paper over the bottom of the board covering the underlap.

It is always well to trace the pattern on the paper on which the design is drawn. If this is done no mistakes are made in transferring to the leather. Tool each corner and dye all at the same time.



Desk Sets

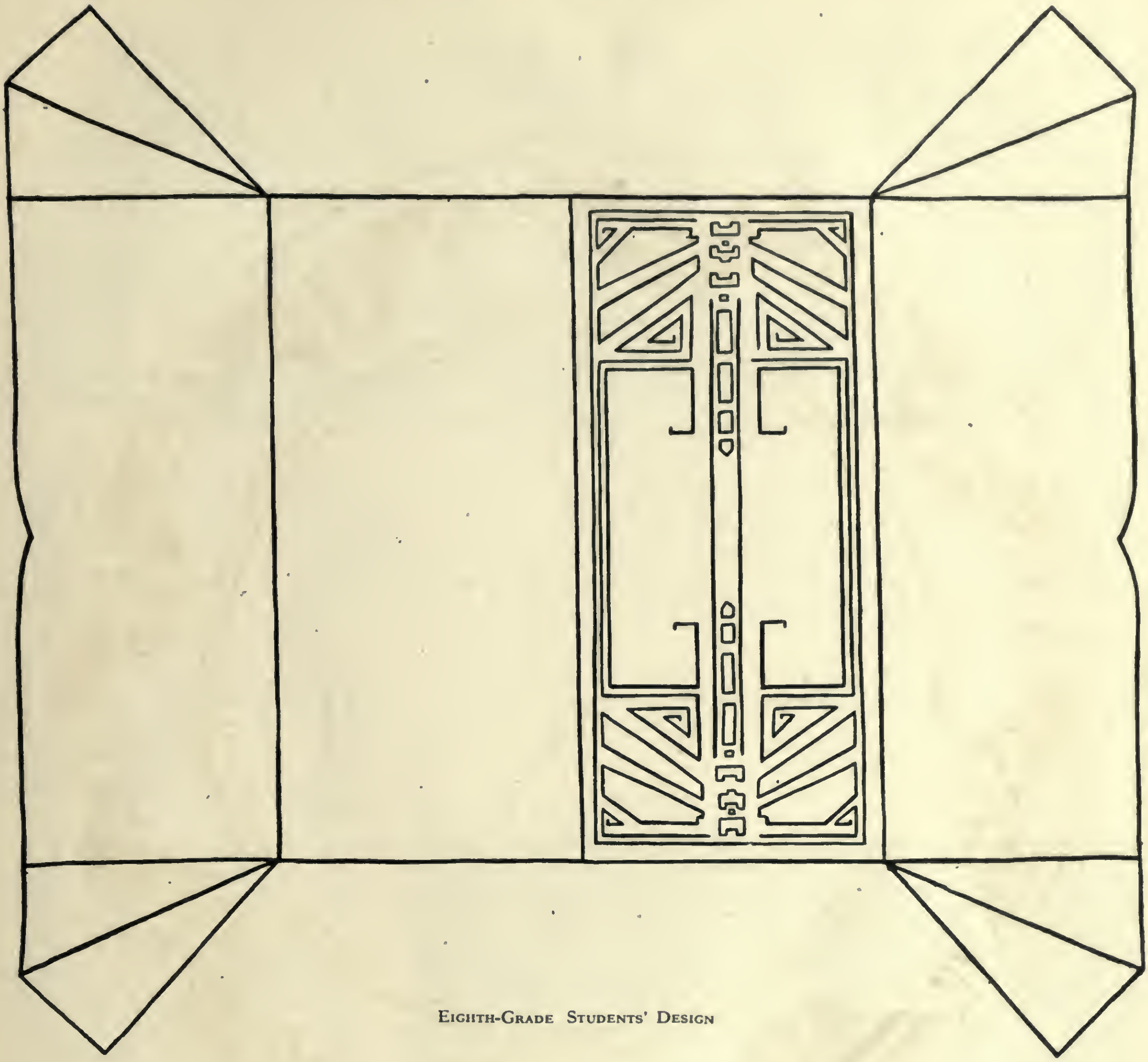
METAL PLATE OR LEATHER MAT



Suggested Design for Tray, Frame, Mat or Plate

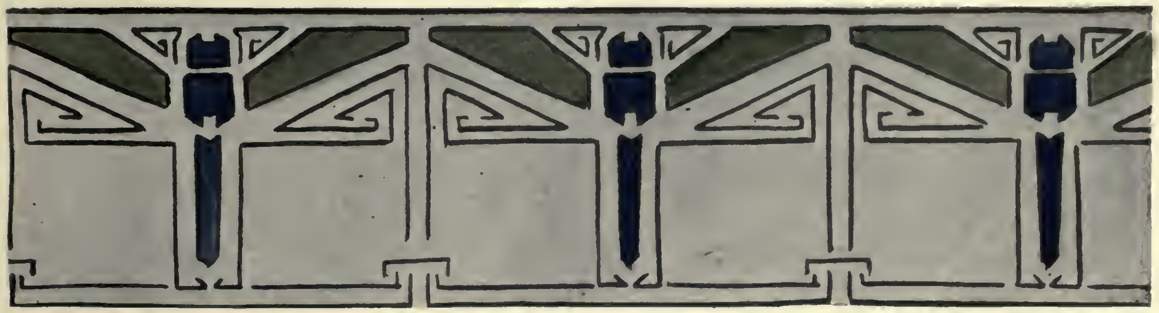
AFTER the space to be occupied by the border has been drawn, divide the circle into as many equal parts as desired—five or seven being a good division. Leave a plain margin outside of the border from one-half to one inch, according to the size of the circle. Divide a section in two equal parts by drawing a line to the center. On this line build the head and body of the insect as in a straight border, but curve the horizontal lines with the outside circle and all vertical lines converge toward the center. When a satisfactory unit is made, use the compass to true the curving lines and trace in each division, following the directions for connecting units in borders.

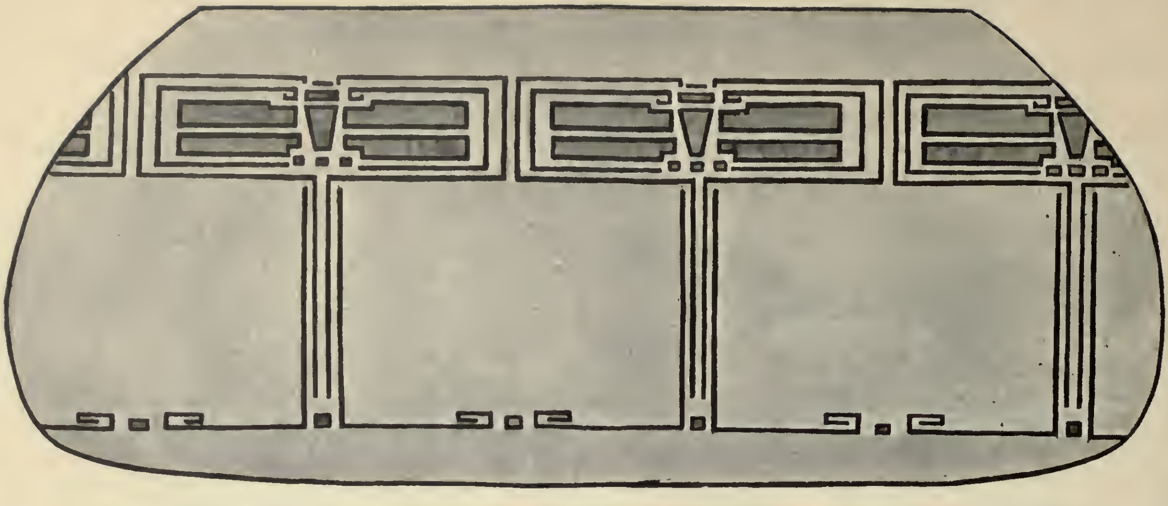
LETTER CASE



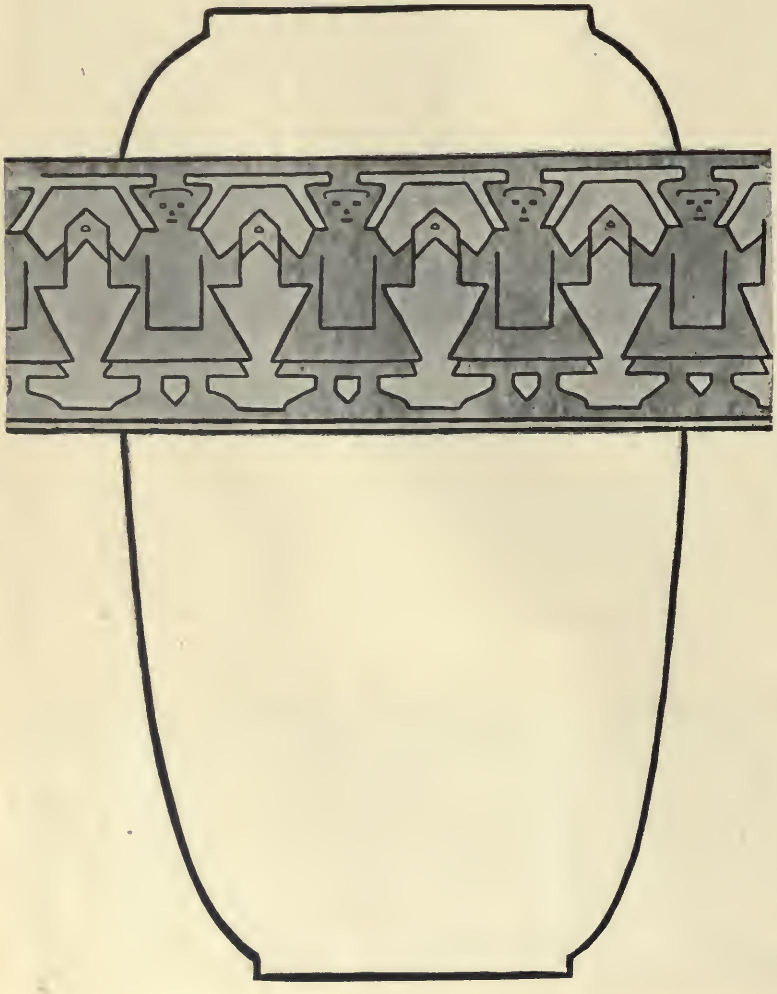
Eighth-Grade Students' Design

THE pocket case for letters and papers may be made the size which is most useful. The pockets and gussets may be cut separately or in one piece, as shown above. The design unit is repeated at each end of the space to be decorated and connected by lines. The upper part of the body is divided into two sections which are about equal to the size of the head. Strength would have been added had it been one square and wider than the width of the head. This would have made the path between the body and wings narrower. As it now is the paths are as important as the design.



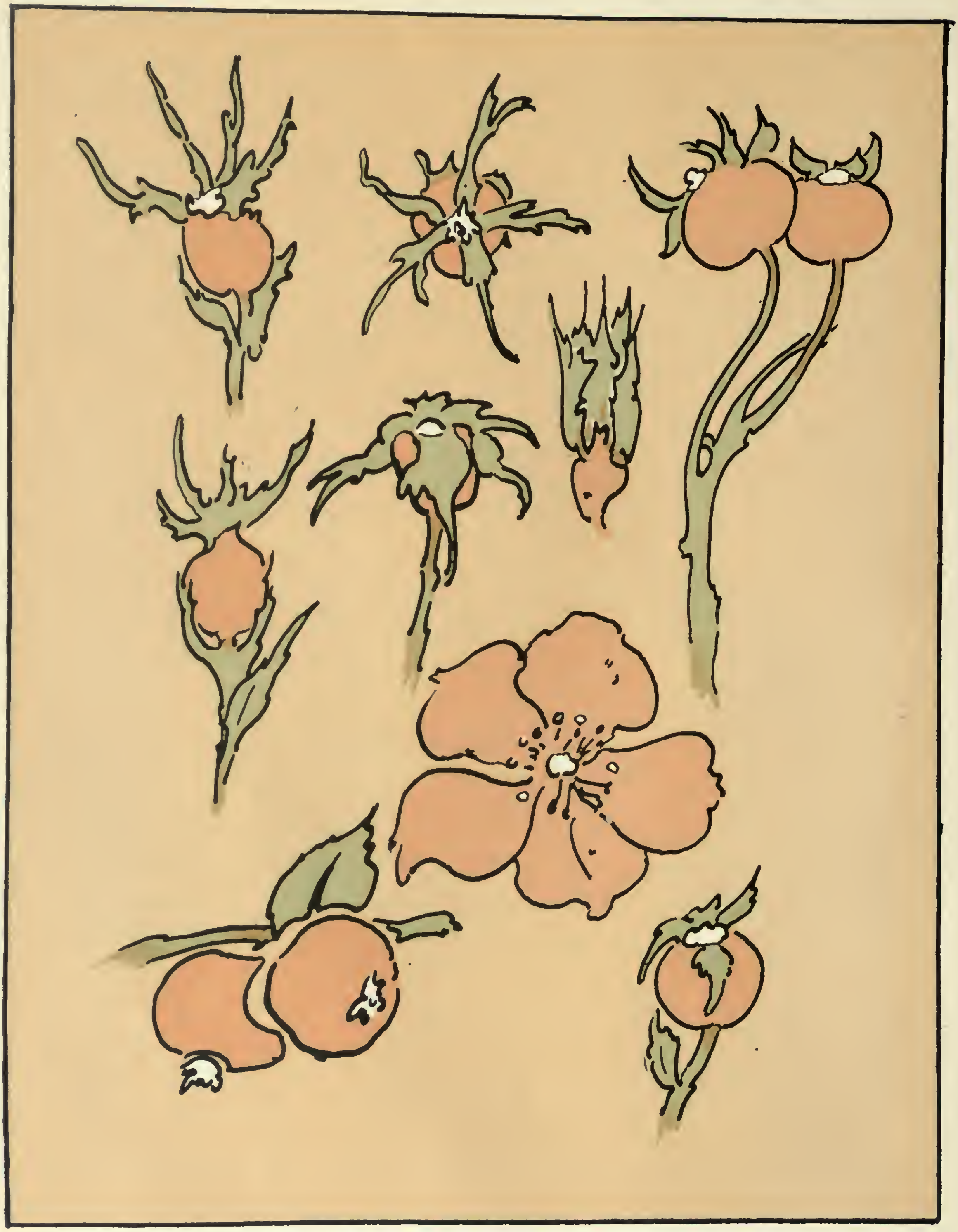


IN the insect design applied to clay, the unit is massed in the upper half of the border, leaving a large open area below and keeping the design as compact and simple as may be. The open areas below are restful and balance the mass of broken spaces above. Always plan large, simple spaces for clay design; have no unnecessary turns in the lines.

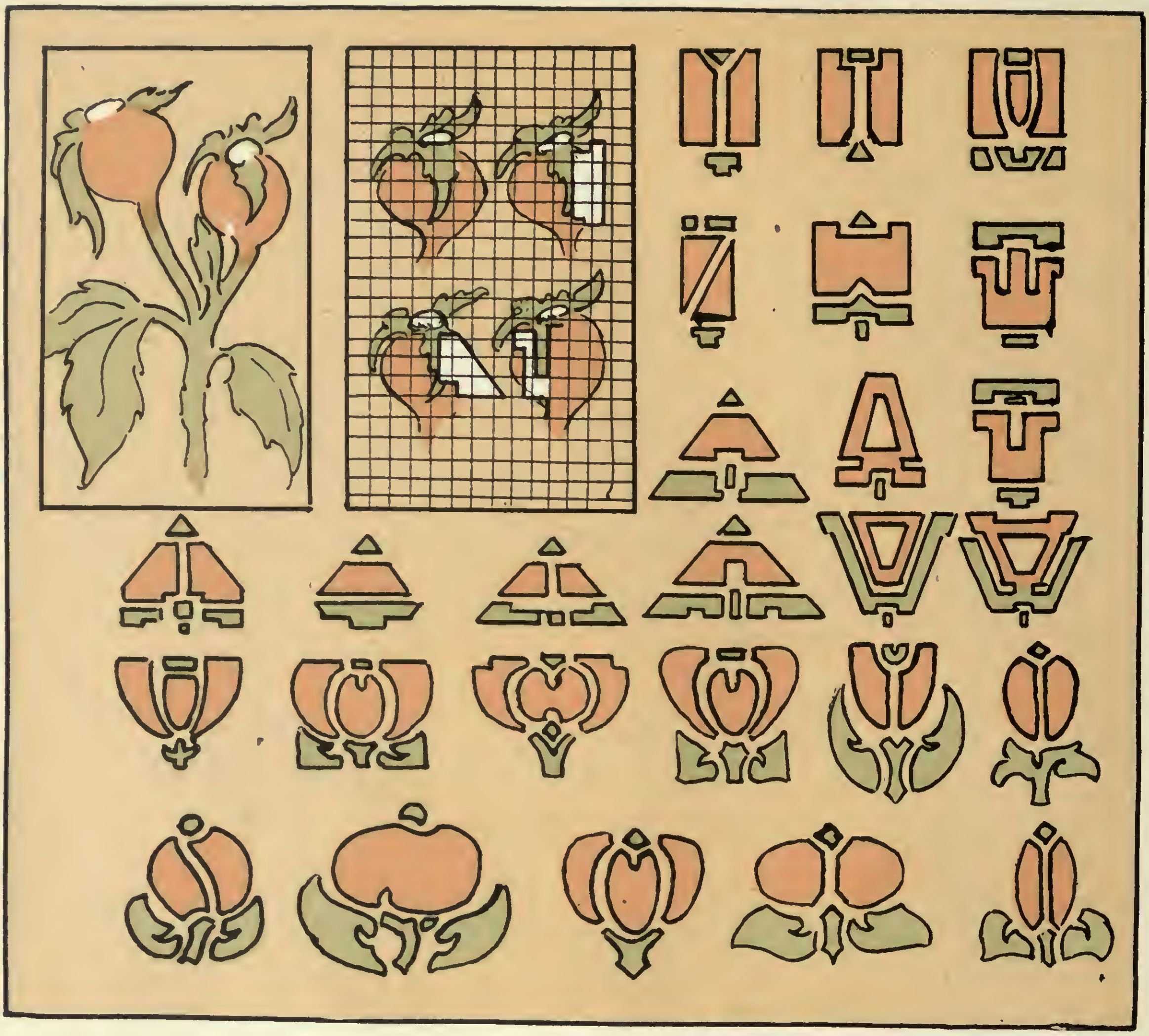


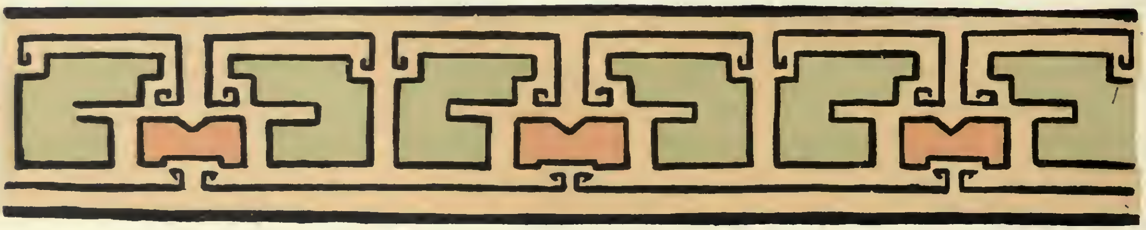
THE general shape of the desired clay piece is drawn on heavy paper. When a satisfactory simple drawing is made, fold it through the center from top to bottom and cut out. This gives a good idea of the size. Keep this pattern, and as you build your clay, measure across the dish and pattern to keep the right size. Build the clay walls about one-half inch thick, as it is often necessary to pare them off.

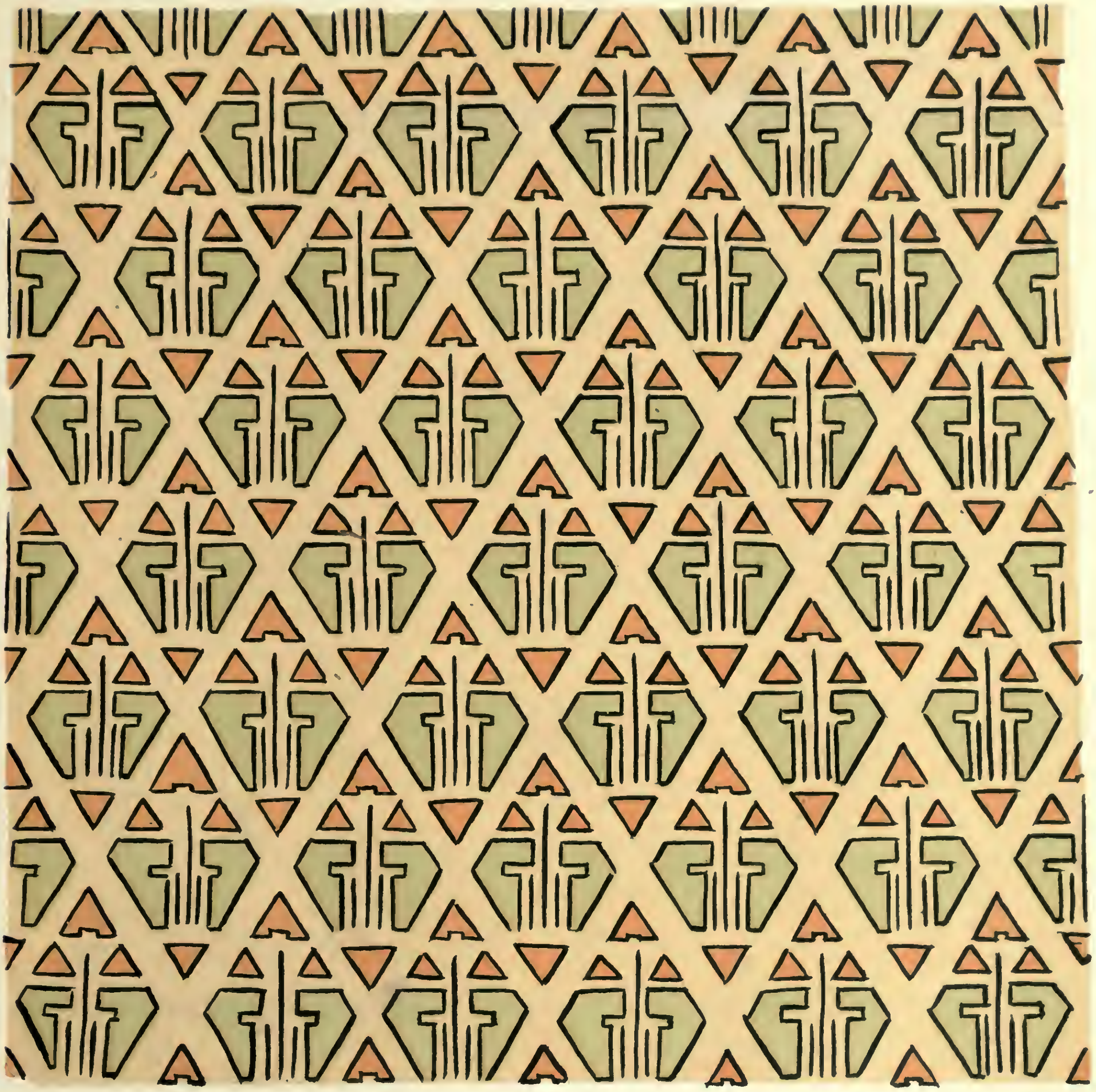
It is necesary to plan as to which part of the design will be lowered, the background or the design unit. Follow the long line of the design as well as the masses in making this decision. In the dragon fly or bowl design the lines, the wings, and the body must be lowered. In the Dutch girl or vase design it is a simple matter to lower the background. The line forming the apron may be deeply incised, as may also be the lines in the face and around the raised parts.



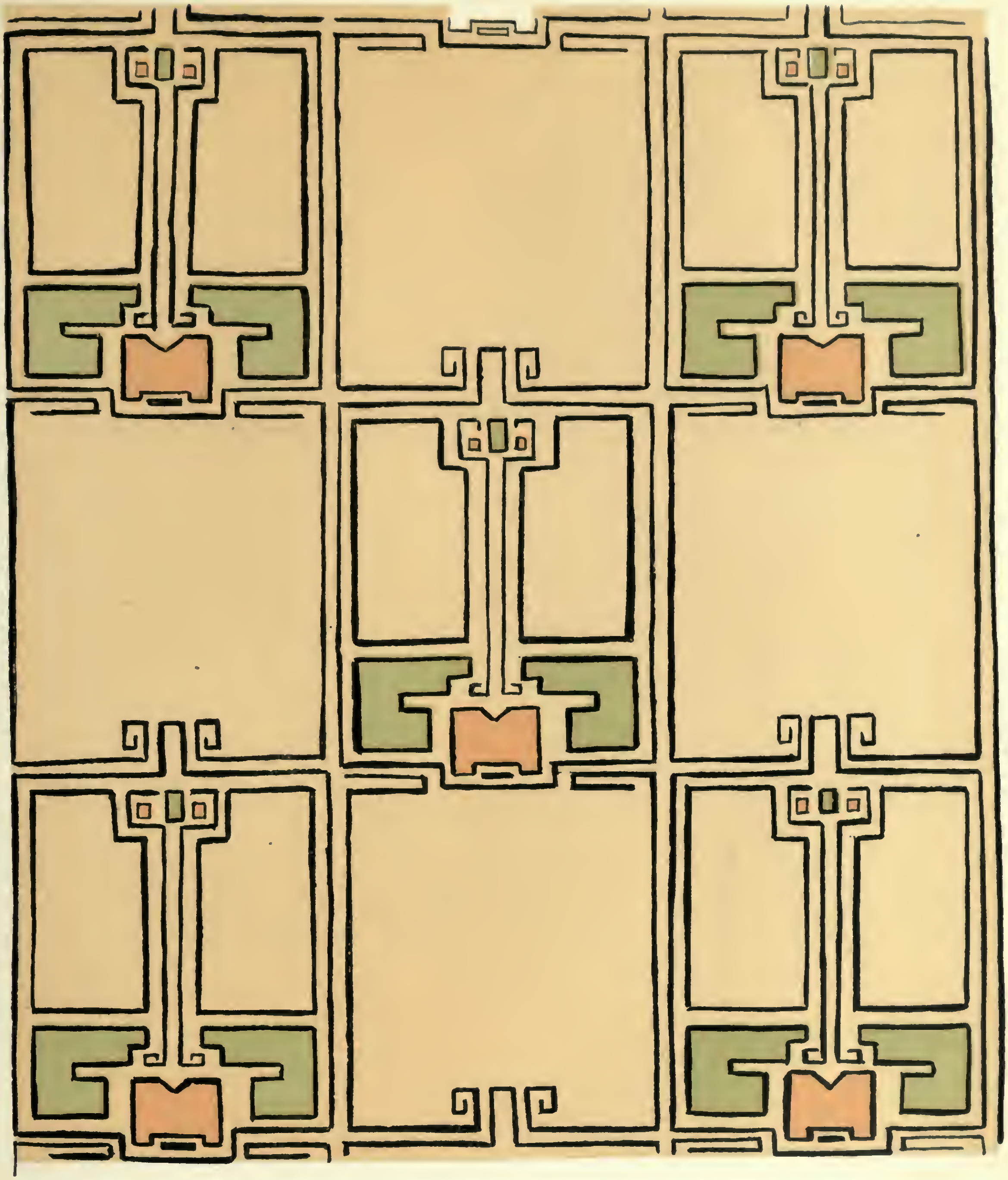
THE natural shape of the Rose is lost in the straight line development of the units made from it (Page 28). The different parts of each unit are suggested by some line or part of the nature drawing, and the squared paper helps in squaring these.



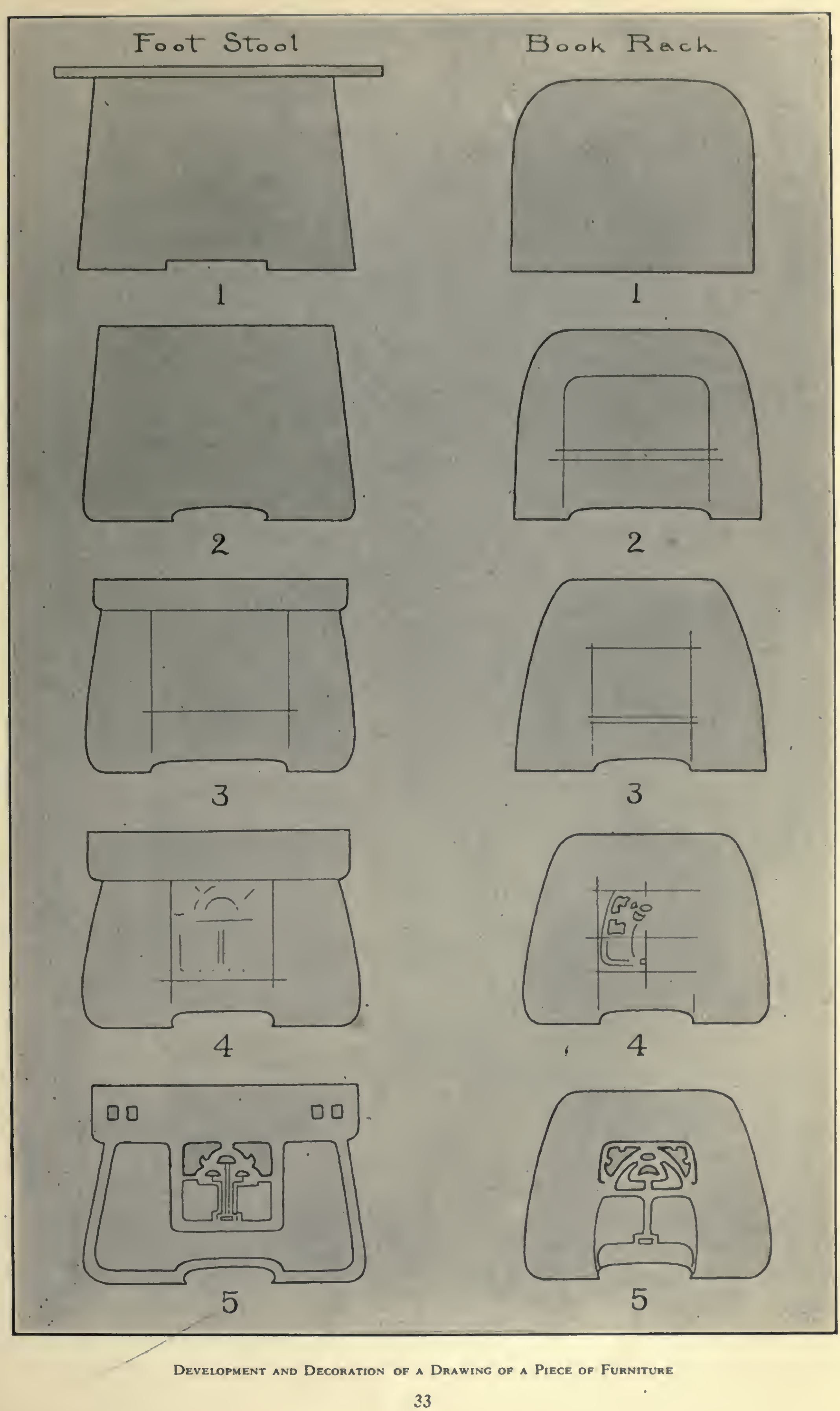




SURFACE designs suggest wall paper or textile designs. The space may be broken by diagonal lines as shown. Fill each space with a unit made from the rose and leaves. Work for a strong vertical movement in using the stems and a horizontal movement through the open paths.



ANOTHER method is to divide the space with horizontal and vertical lines forming squares or rectangles. The unit is usually placed in the alternate spaces. This leaves an open space through which the eye must move and "jump" from unit to unit. To prevent this, repeat some of the more important horizontal lines of the unit through this space. This may be done in such a way as to take the attention from the unit and will bring the design together as a whole.



Development and Decoration of a Drawing of a Piece of Furniture

FOOTSTOOL LEG AND BOOK RACK END

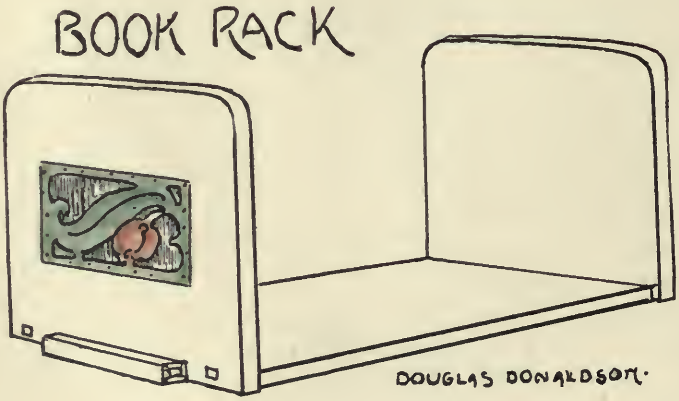
THE problem on page 33 presents the drawing of the leg of a footstool and a book rack end and decorations of same. The size of the design space is limited by the constructive features.

FOOTSTOOL LEG

Sketch No. 1 shows the simplest modification of the outline. In No. 2 the corners are curved to make the form more pleasing. To give variety (No. 3), the extension is added at the top, and a larger cut made at the base. By limiting the width of the design space to the width of the cut at the base, and the top of the design by the line of the extension, we find that it is too wide and too high. The top of the stool would over-shadow the design and the side margins are too narrow. It conveys the impression of a stool constructed around a design space. To correct this, the cut at the base is again made narrow (No. 4). The design space, which spans the curve, is thus in better relation to the margin. The extension is made deeper, which allows a good margin at the top. The design in No. 5 follows the constructive lines throughout.

BOOK RACK END

Compare No. 2 and No. 3. The width of the legs in No. 3 is more nearly correct, and the size of the decorated space does not crowd the margin, as in No. 2. In No. 3, the margin at the top is too wide. Note improvement in margin arrangement in No. 4. No. 5 permits of the arrangement of the line design to appear as a part of the construction of the base.

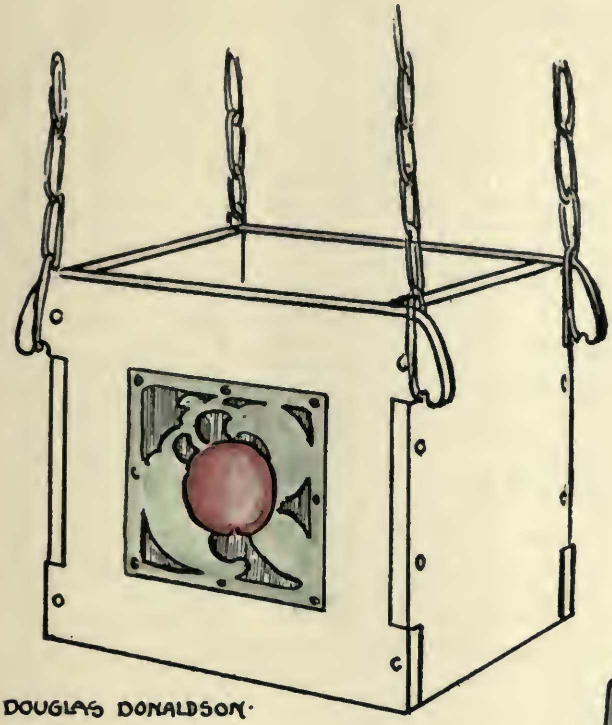


MADE in either hard or soft wood. The bottom or baseboard projects beyond the ends, and sufficiently to give the impression of solidarity and support to them.

The ends are cut out to fit over these projections.

The decorative panel falls in line with that portion of the baseboard that protrudes. This panel and protruding base so divide the end vertically as to give the impression of three pieces. The two side pieces extend flush with the bottom of the baseboard and act as feet for the rack to stand upon. The placing of the bolts or lag screws adds to the structural effect and forms a pleasing decoration. The panel may be made either in leather or metal, or it may be carved if desired.

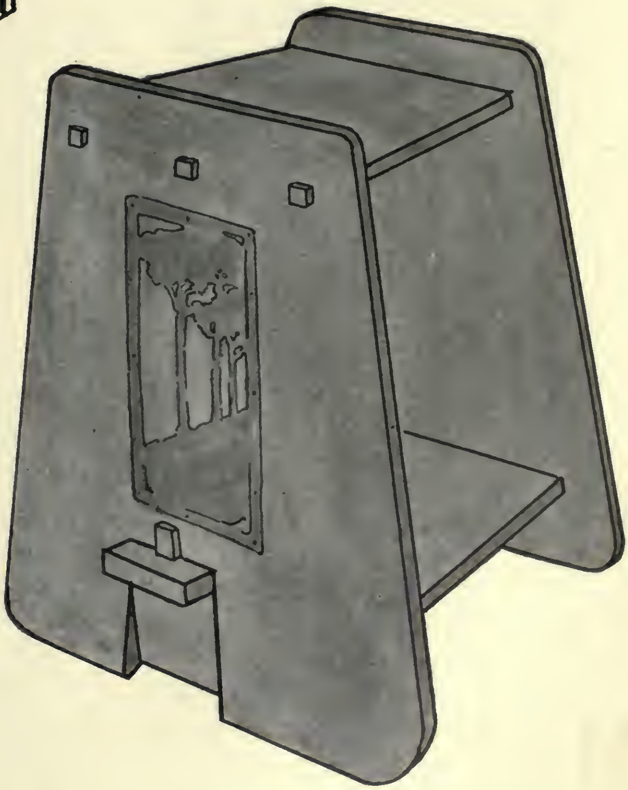
HANGING PLANT BOX



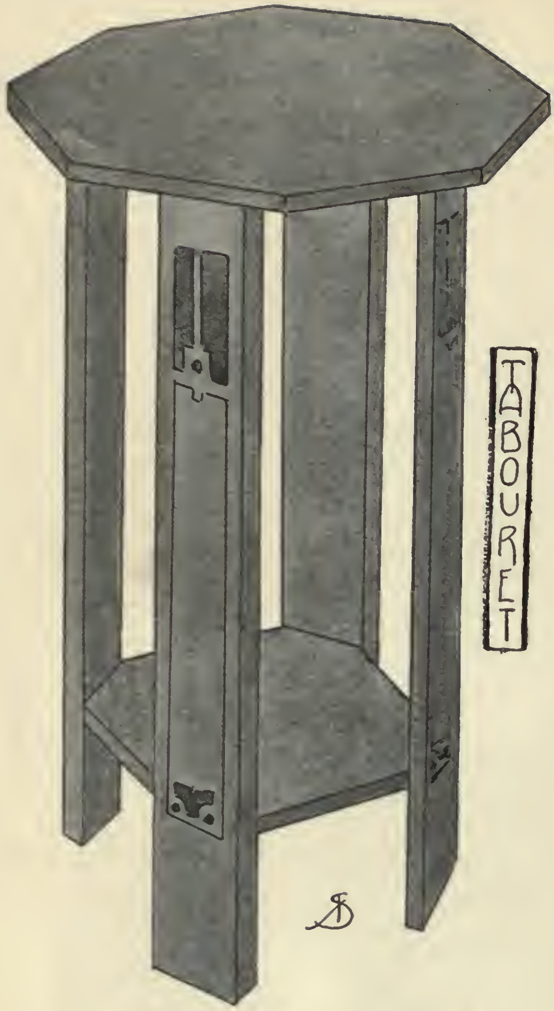
THE material used in the box shown is inch redwood. The upper and lower corners of two opposite sides are cut out, while at the top the other two sides project, as handles. These projections hold the chains by which the box is suspended. Bolts or screws are used in fastening the sides together.

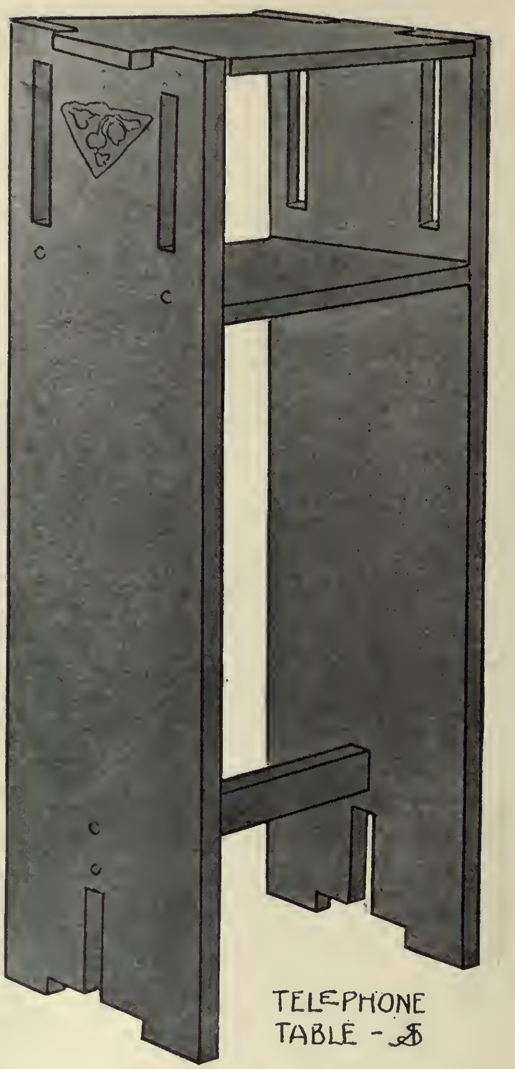
The inlaid metal panel is made to fall in line with the supports at the top and with the side joints. A water-tight metal box made so as to be easily removed, should hold the soil. This may rest upon cleats fastened from the inside.

THE upper shelf of the plant or jardiniere stand is made with flush joints and fastened with lag screws. The lower shelf is made with a tenon in the central portion of each end. A suggestive feature of this model is the decoration of the structural elements. The lag screws, panels and tenon form the end decoration. The inlaid copper panel and the tenon fall in line with the chiseled-out portion below the tenon. This divides up in good proportions what would otherwise be a monotonous surface. By cutting away the central portions of ends at the bottom, we have given the impression of legs or supports.

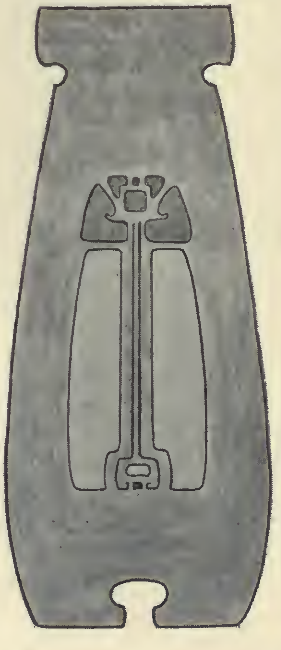


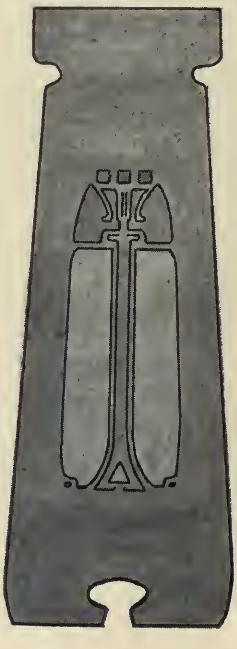
IN the telephone stand, page 36, note the proportion of the short lines of the shelves to the long vertical lines of the sides. The contrast between these lines has been even more emphasized by the openings in the sides. By substituting a pierced copper panel for the veined design, the appearance would be improved. The length of the panel would naturally be determined by the opening in the side. The overhanging projection of the top might suggest the width. By the use of a router plane, it will be possible to inlay the copper level with the surface. This makes it a part of the whole, rather than giving the impression of a tacked-on decoration.

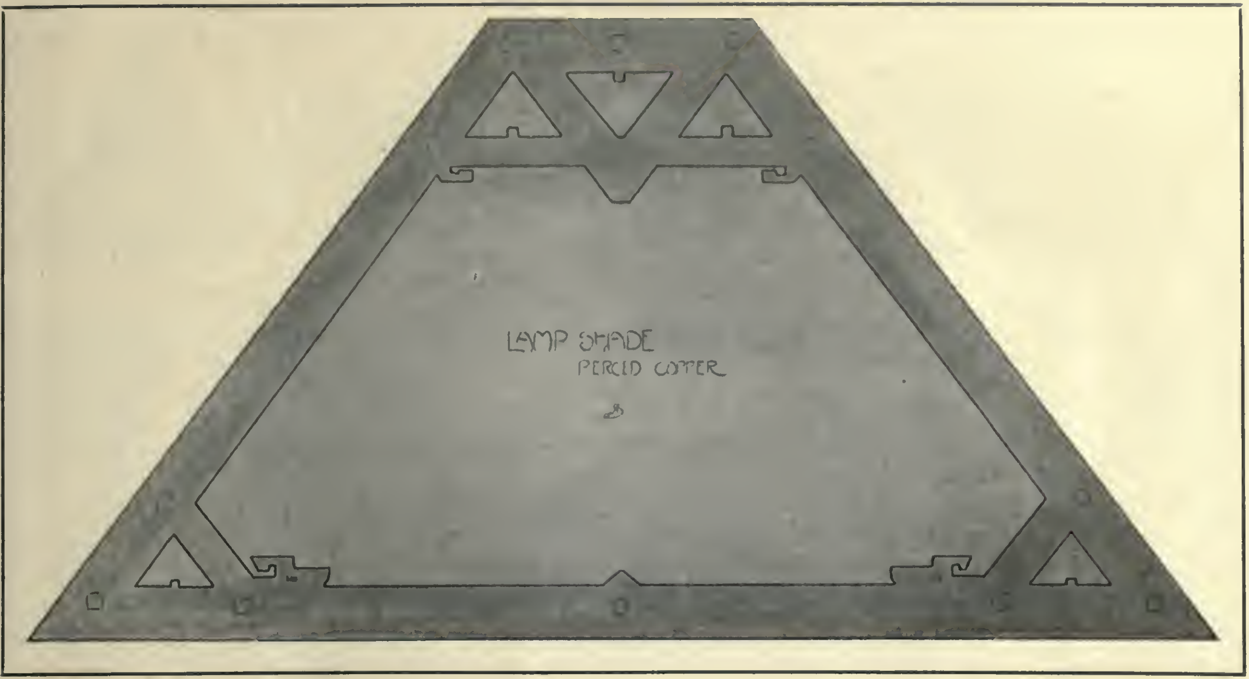


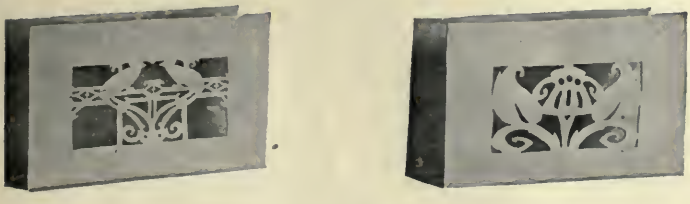

TELEPHONE TABLE - S

LEGS for tabourets are usually much too ornate. The type here shown makes a simple eighth-grade problem, and the straight line designs lend dignity to its otherwise plain appearance. The designs presented are suggestive of considerable modification. By altering shape and proportions a number of forms may be evolved. The legs, shown in the two lower drawings, may be adapted to the hexagon style with three slanting legs. The light spaces are to be sawed through and removed, and veining added to complete the design.



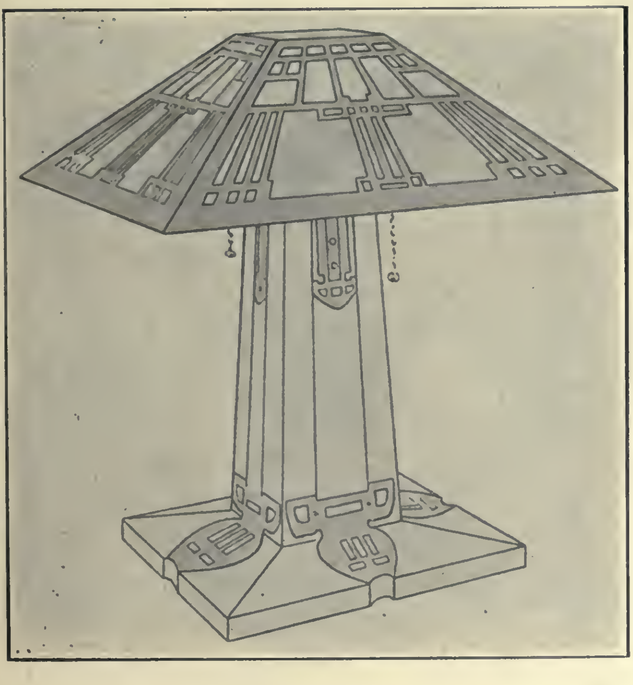


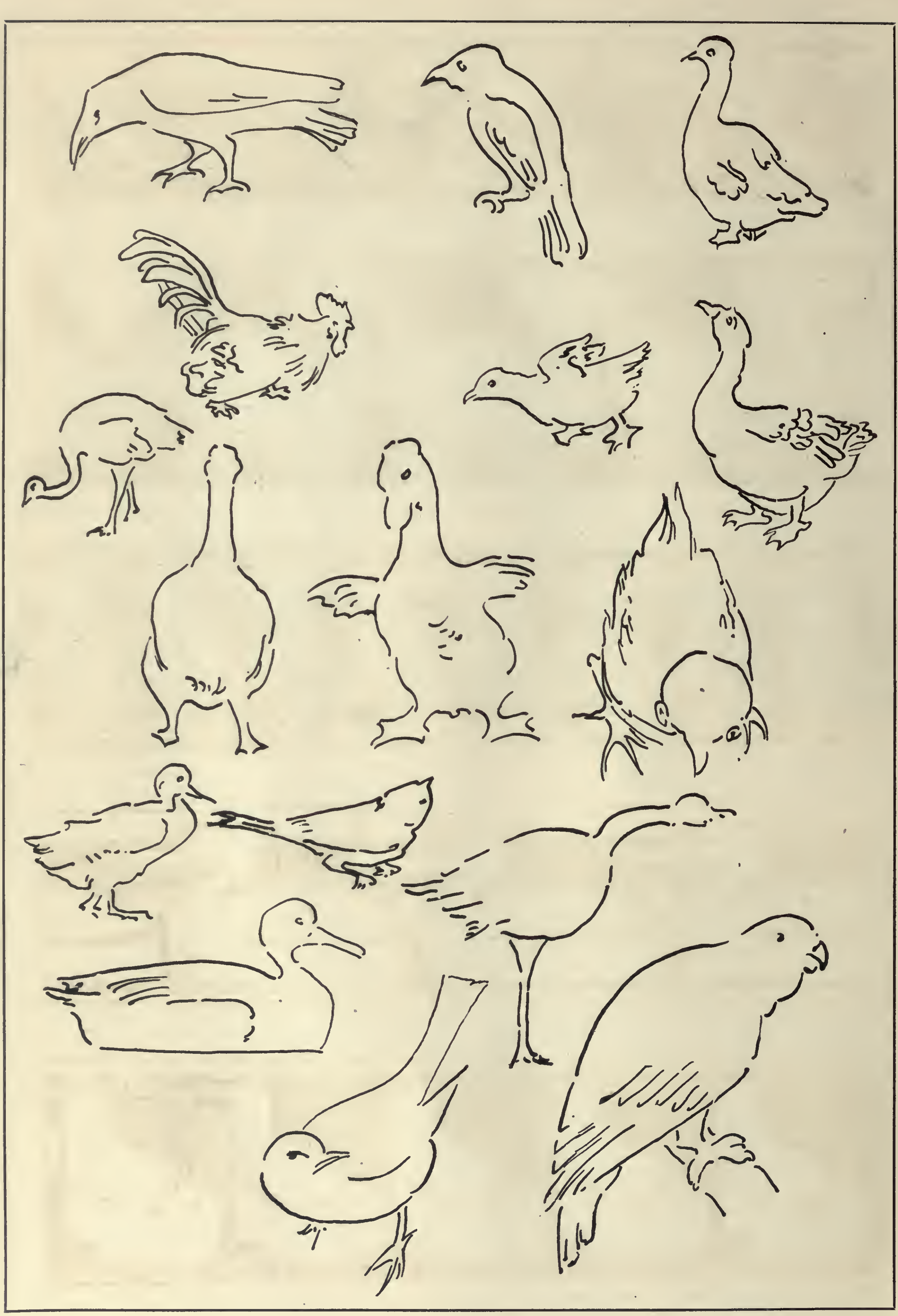


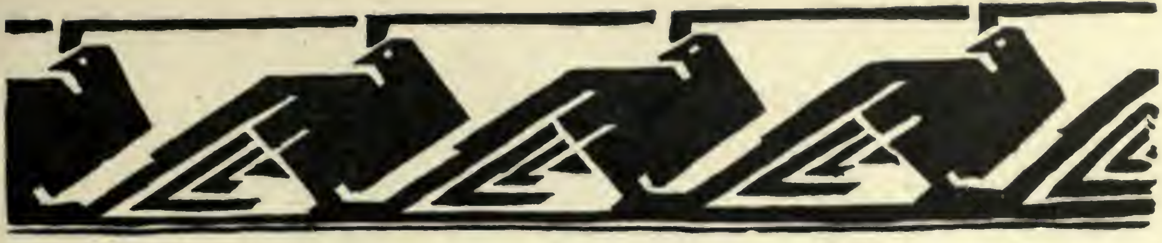

Metal Letter Holders

DESIGNS APPLIED TO METAL

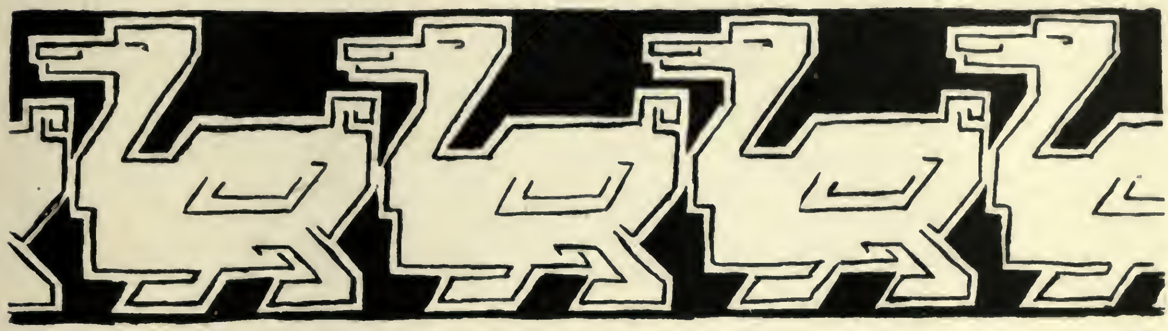
IN planning sawed metal work give as careful attention to the shape of the spaces to be sawed out as to the parts which are to be left. Here again the relation of large and small spaces must be considered. The copper decoration on the base and sides of the lamp stand add to the appearance and lend an individuality of treatment. In the two letter holders the background of the design space is sawed out, leaving the design in simple relief. All sawed edges are filed to make them smooth and even.

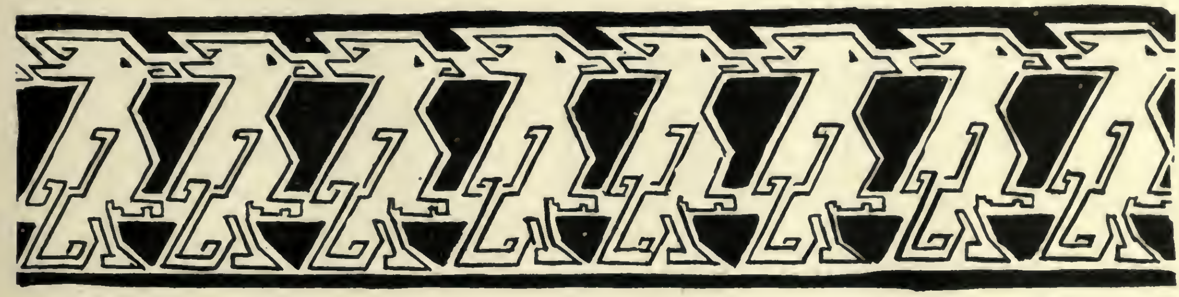




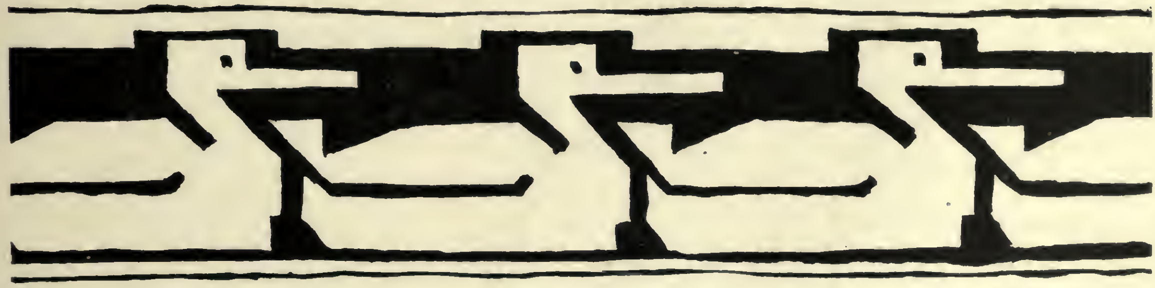


LOUISE BERRY

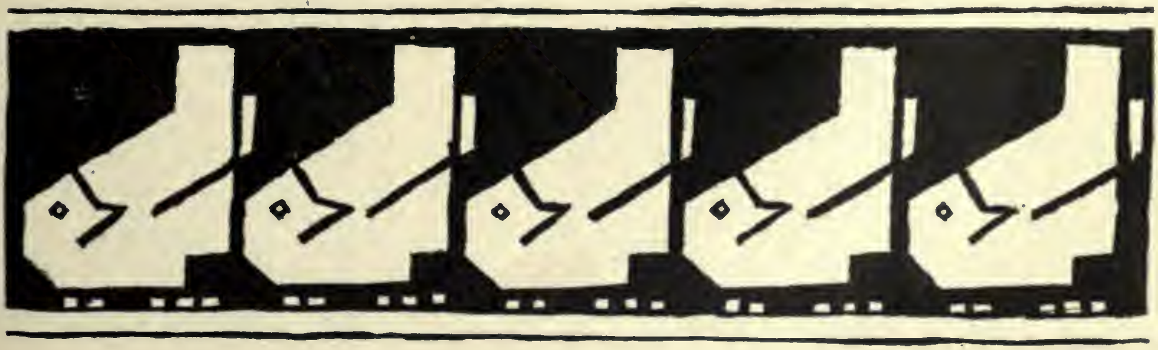




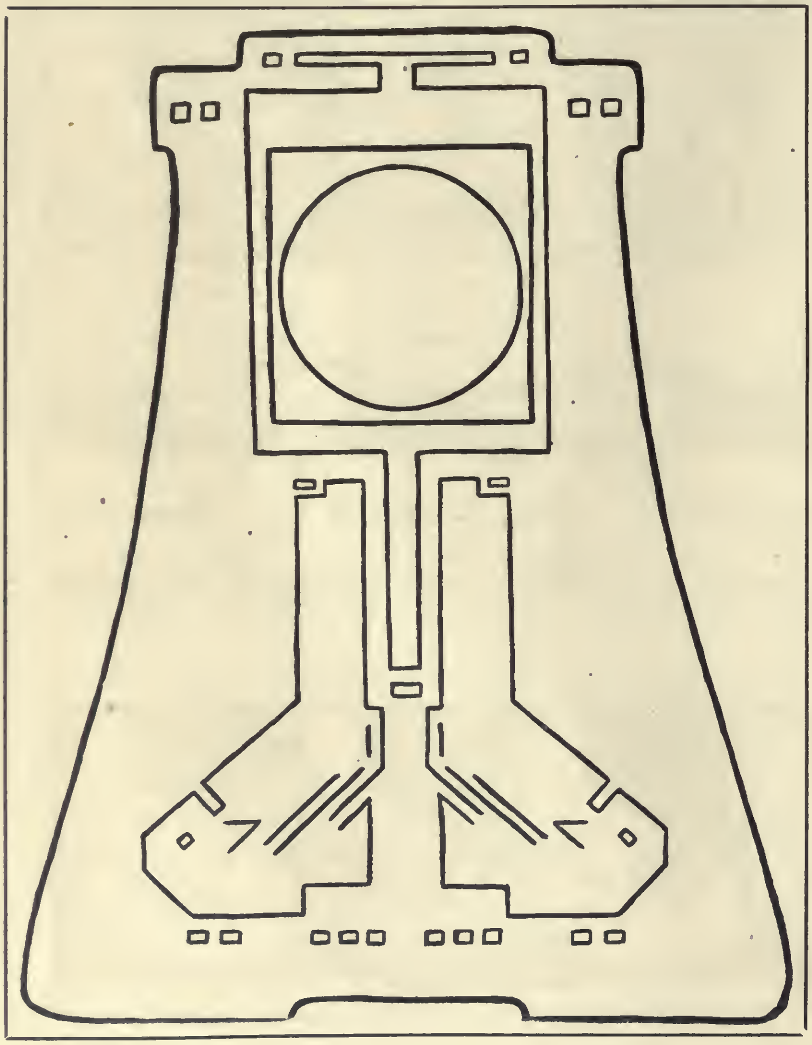
FLORENCE KELLOG



BETH PUTMAN

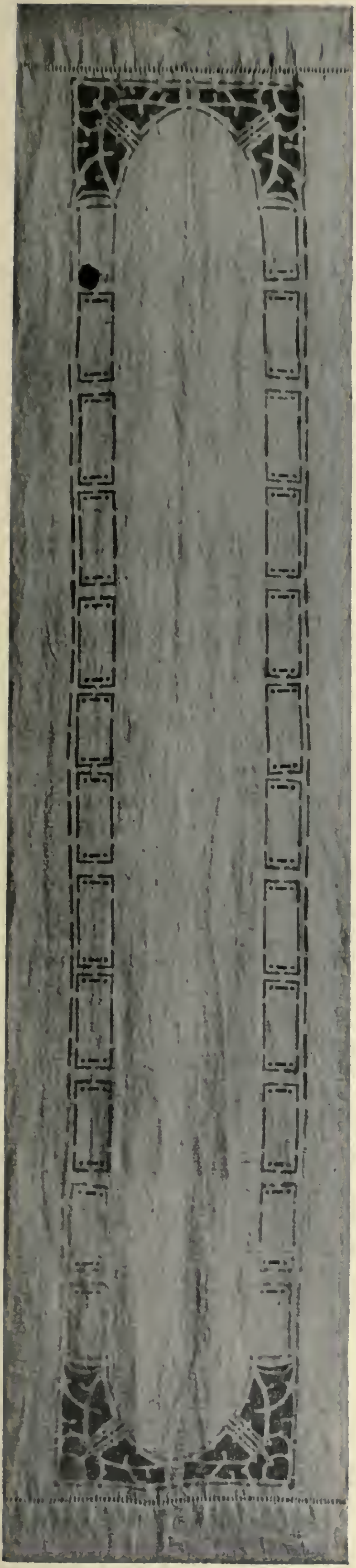


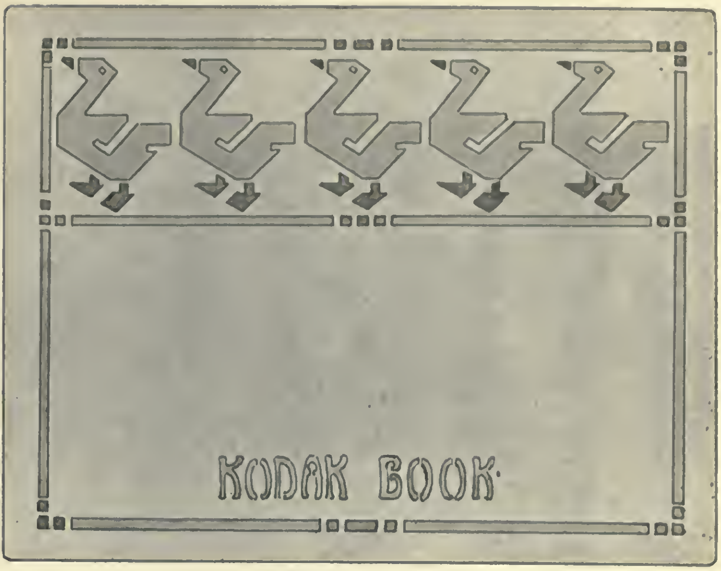
BETH PUTMAN



THE standard for the front of the clock may be made of any soft, even grain wood. The design is veined deeply enough to allow for the use of different colored stains, without overlapping. The small squares may be cut out with a chisel and colored in a bright vermilion or green. The birds may be in yellow and the background in brown. Various color schemes may be tried on tracing paper, thus doing away with the necessity of experimenting with stains on the wood.

A metal face and hands for the clock may be made. A small clock may be placed in the opening and supported on a shelf fastened in the box or case at the back. (See page 49 for directions for constructing this case.)

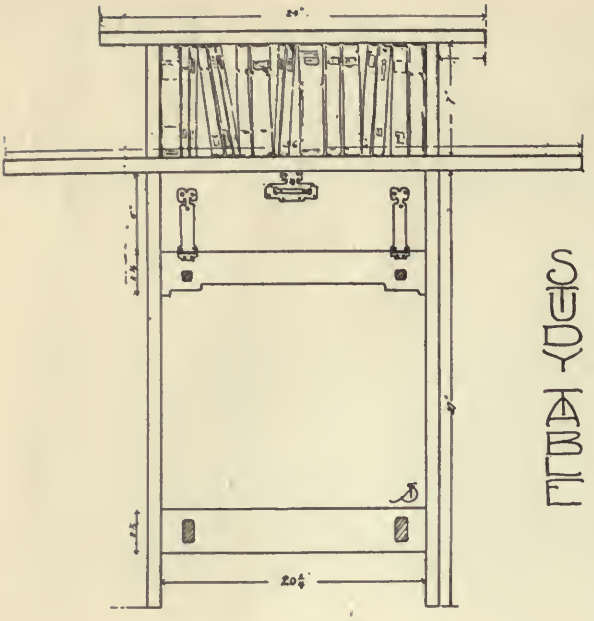


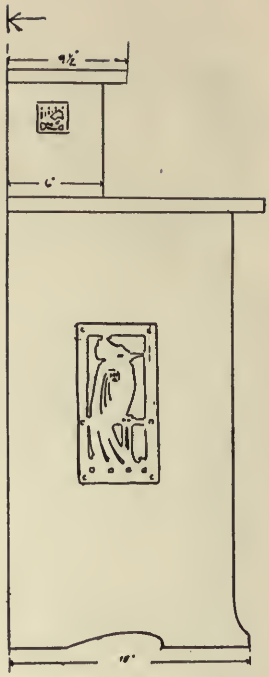


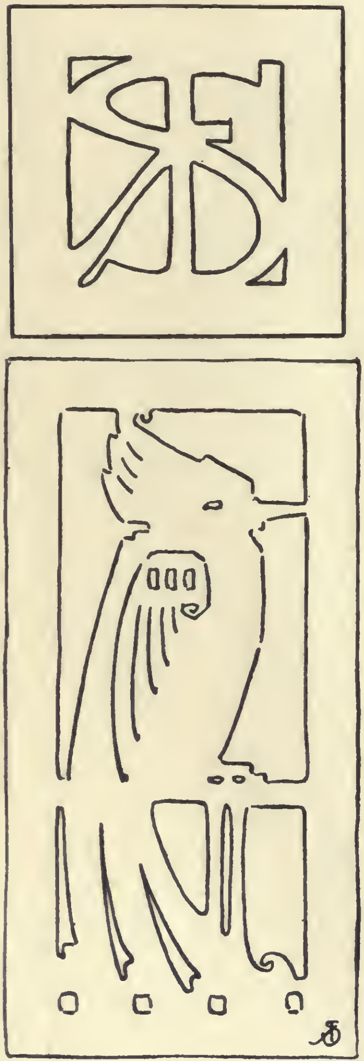
STENCILING

IN stenciling the simplest design should be used as it is transferred to stencil paper. The unit is then cut out, leaving the background. Use carbon paper in transferring the design and a knife with a very sharp-pointed blade in cutting. The edges must be cut clean and even. Wide paths or ties are left between the different parts. Narrow ones tear easily. The cloth is stretched over a piece of blotting paper and the stencil paper tacked or pinned in place.

Color: House paint, thinned with two parts of Japan dryer to one of turpentine, may be used, as the color washes better than most dyes. Mix the colors to get the desired color scheme, and thin with the above mixture. Try the colors on a piece of the cloth to be used. A bristle brush, cut short may be used in lieu of the regular stencil brush. Wipe the color out of the brush before painting it on the design as very little color is needed. The color will creep under the edge of the stencil paper unless it is held in place very carefully and closely. If the paint is too thick it will hide the texture of the cloth and stiffen it also.







Decorative Details Enlarged

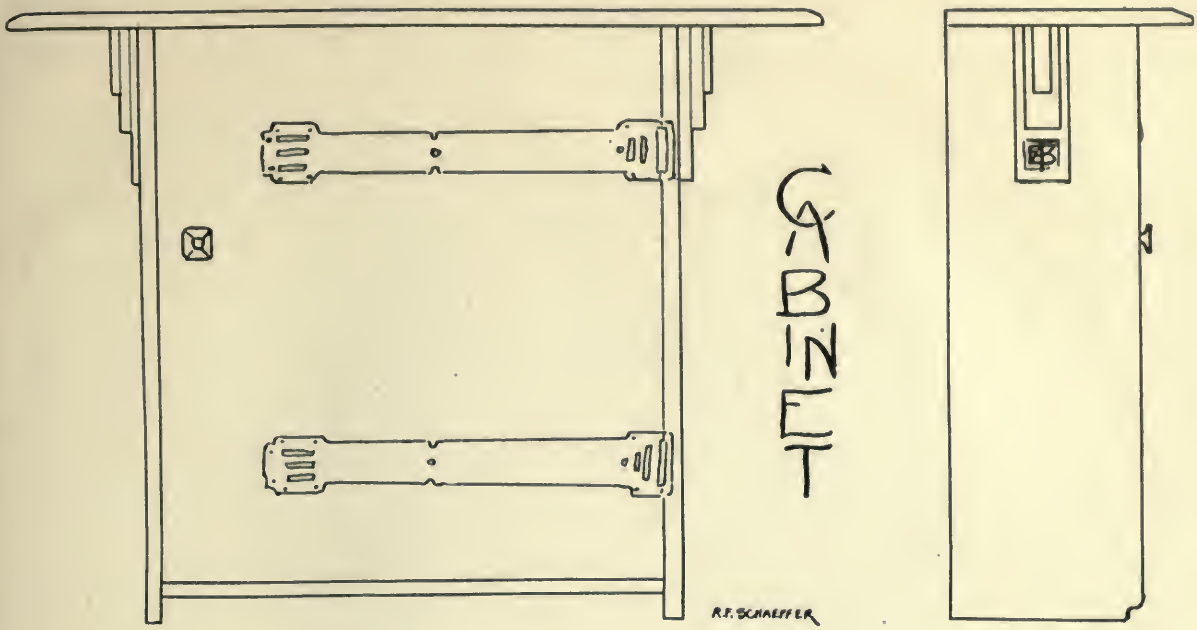
STUDY TABLE

THE bracing of this table against side strain must be secured by the bottom rails, the top rail in front and the back piece which corresponds to the hinged door of the front. These four pieces should be joined to the sides by mortise and tenon joints, using blind mortises, about three-fourths inch deep and making very snug fits (see page 8). The book shelf is best made separately and secured in its place by dowels holding it to the top.

The entire open space provided for books may be used for this purpose as indicated in the drawing; or if desired, a series of drawers may be built in at one or both ends of this open space. The space at one end may also be used for pigeon holes for envelopes, and horizontal shelves for letter paper are easily arranged for.

The space enclosed by the hinged door in front may be divided into pigeon holes or compartments; or here, also, there may be a series of drawers.

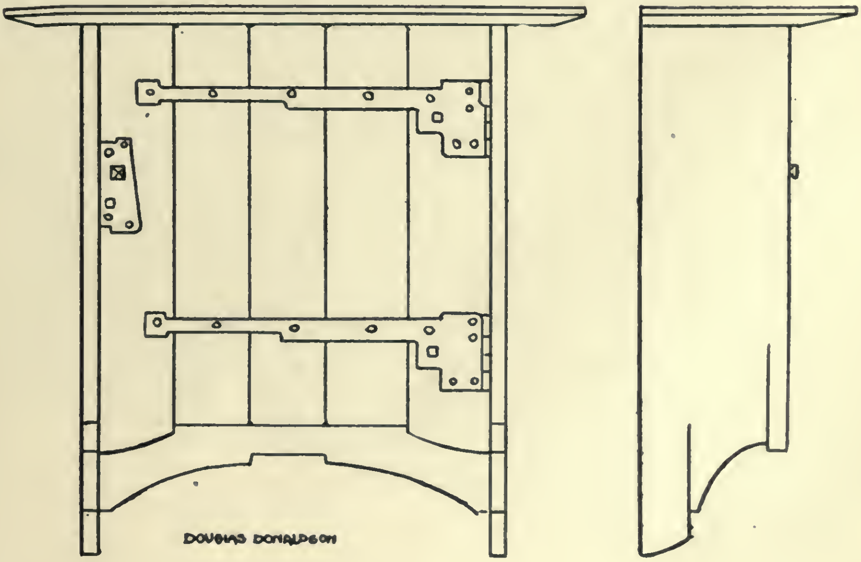
The decoration is added in sawed copper and held in place with copper tacks. The wood background is cut away sufficiently so that the copper may be set in level with the face of the wood. A touch of bright color back of the copper lends a most charming effect.

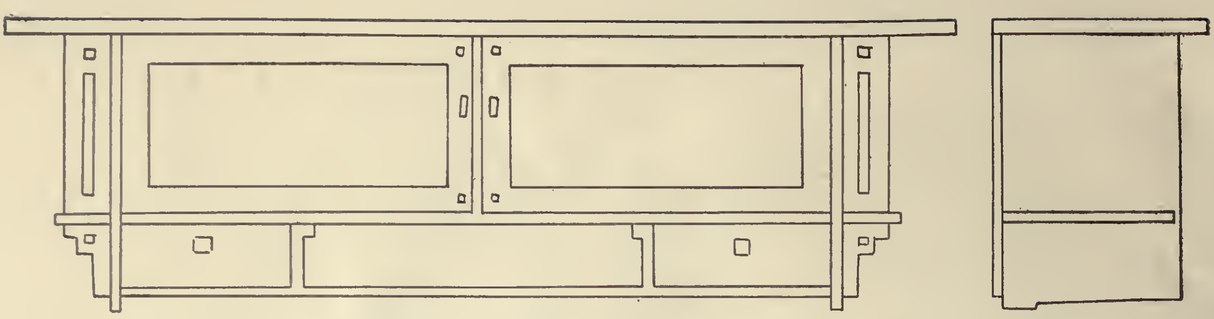


IN all these cabinets wherever a butt joint occurs, the edge should be let in by cutting a one-quarter-inch gain to receive it.

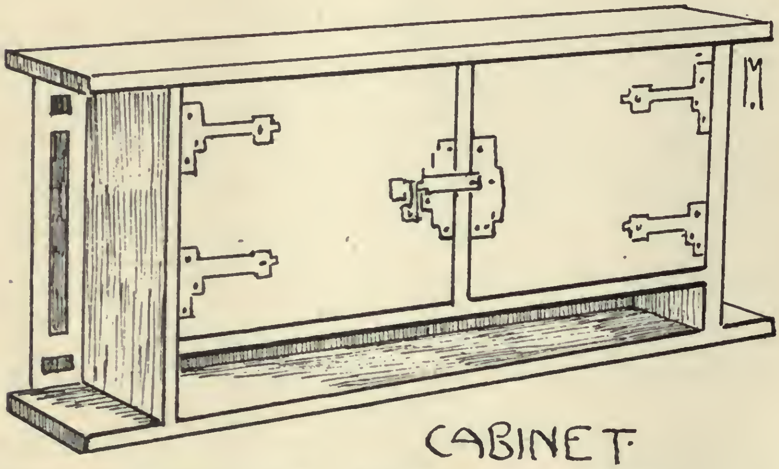
The side strain brace must be secured by the back which must fit accurately to accomplish this. The hinges will be much stronger if they are secured to the narrow faces of the jambs or sides. If they are screwed against the broader inner faces, the open door will produce a strain that may split out the wood of the jamb. Stock hinges may be used if the more ornamental copper hinges can not be made or if the cost is prohibitive.

WALL CABINET





WALL CABINET - S



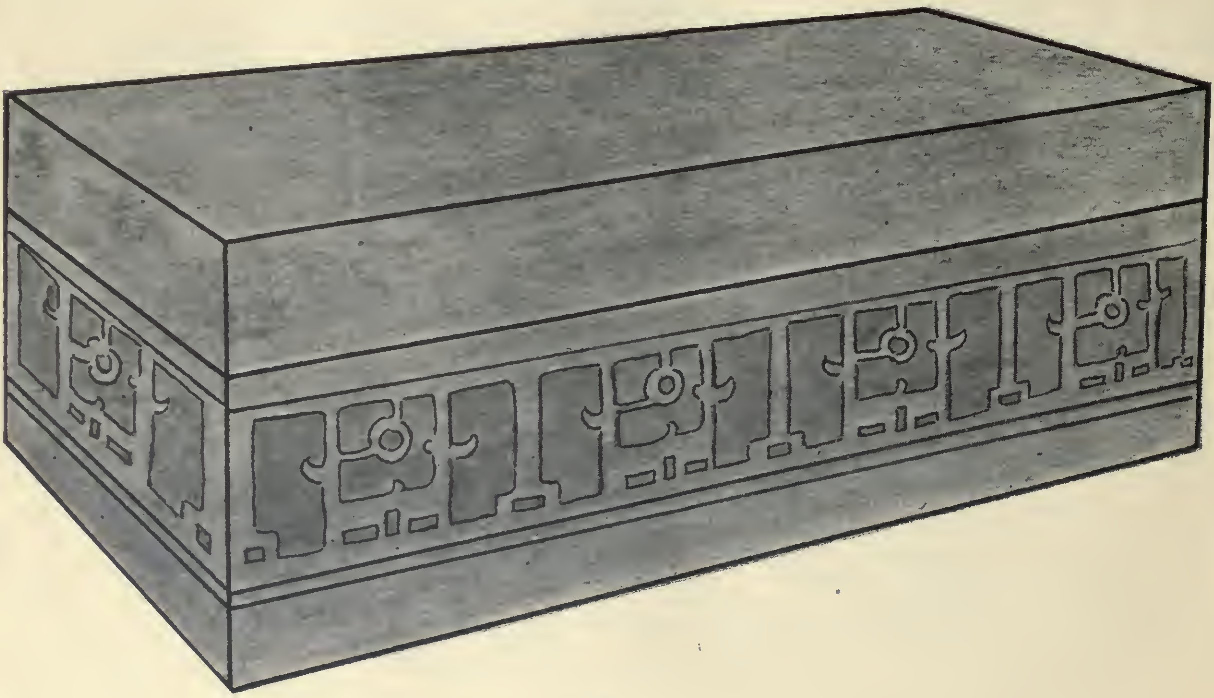
CABINET

GLOVE BOX

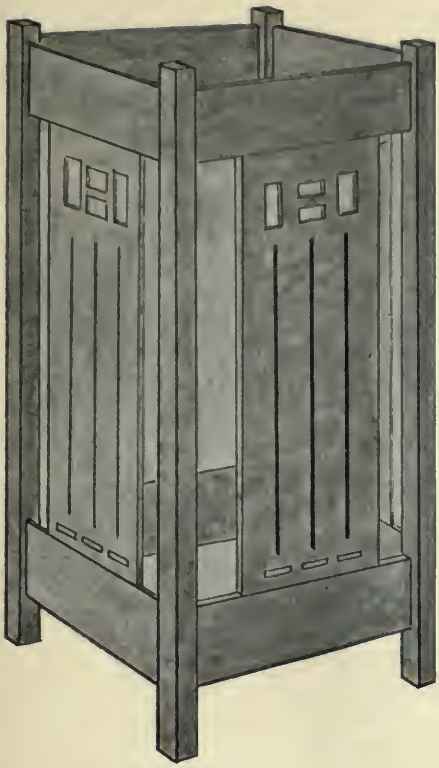
WITH a small box it is much better to make the lid, not of a single flat piece that will warp, but of a flat piece with sides that will stiffen it;—like the bottom except that it is not so deep. The relative depth of the top and bottom of the box is determined by the principles of breaking surfaces in designing.

The box should be made solid, that is, the sides, top, and bottom should all be glued in place. When dry, the line between top and bottom should be scratched with a gauge and the box sawed in two along this line and the rough edges surfaced smooth.

The sides may be joined with butt joints or with rabbetted joints. The latter are best suited to hard woods, the former to soft woods. As in all boxes, the ends should butt against the sides; and the top and bottom should be fastened to the edges of the sides. The top and bottom thus have the full length and breadth of the box. If desired, the top and bottom may be made so as to project and can be trimmed down and squared after the glue is dry.



UMBRELLA STAND



Umbrella Stand

THIS consists of four legs, four top rails, four bottom rails and four panels, all of wood, joined with mortise and tenon joints. The bottom of the stand, on which the points of the umbrellas rest, is best made of a removable pan of zinc or galvanized iron resting on a strip run around on the inside of the bottom rails. This bottom may be made of wood.

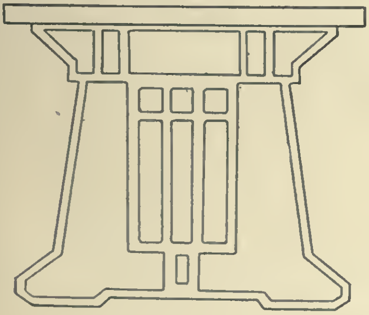
As the stand is square, an elevation at one side is enough for a complete working drawing.

The mortises on the two adjoining faces of the legs should be cut to meet in the center of the leg and the tenon that enters them should be cut to a mitre joint where they meet at right angles in the leg. This makes much the strongest joint.

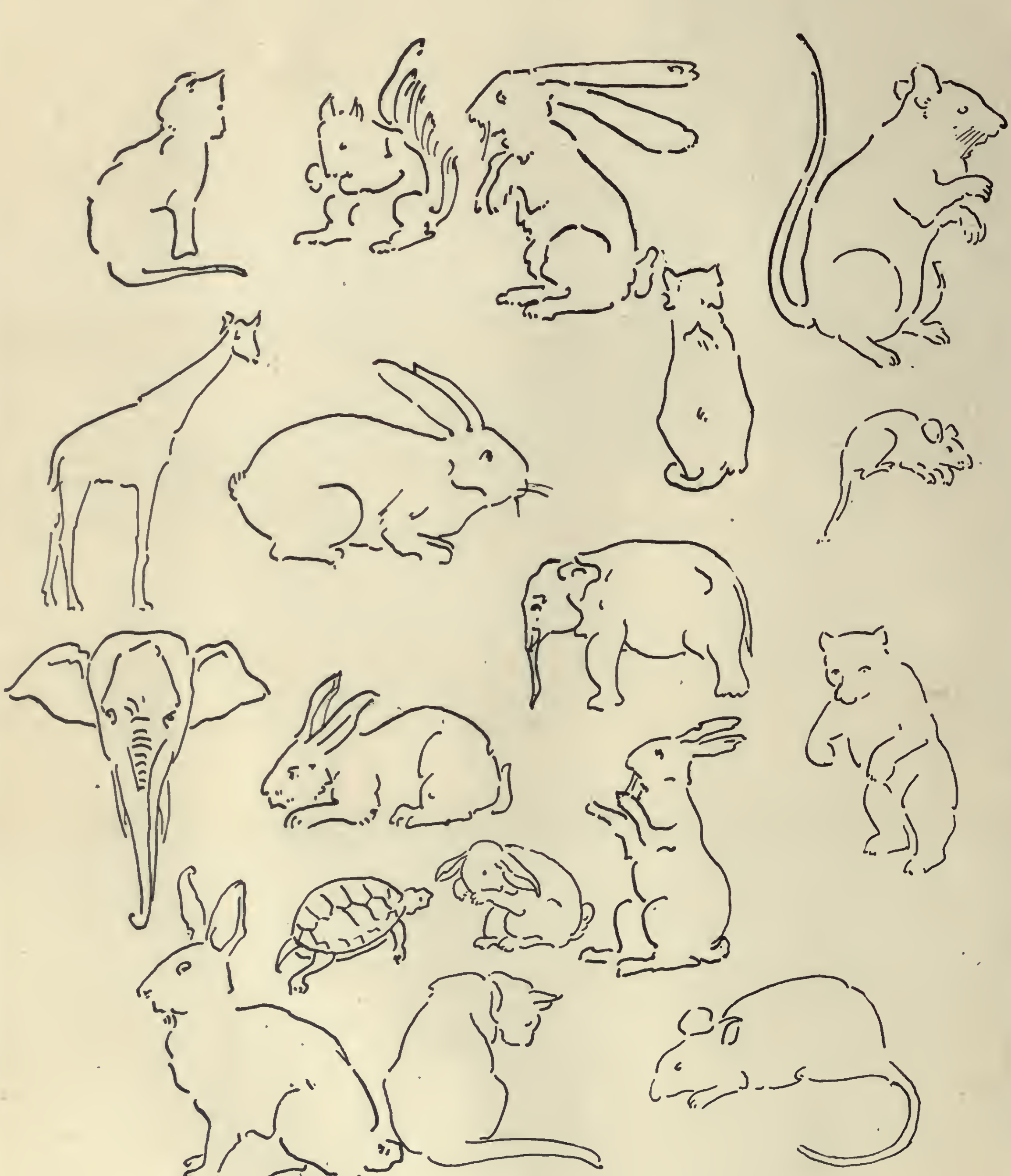
The tenons should be not less than three-eighths inch thick and they should all be cut with a shoulder butting against the surface of the leg, to hold the rail square and firm (see page 8). Use the same style of mortise and tenon in fitting the panel pieces.

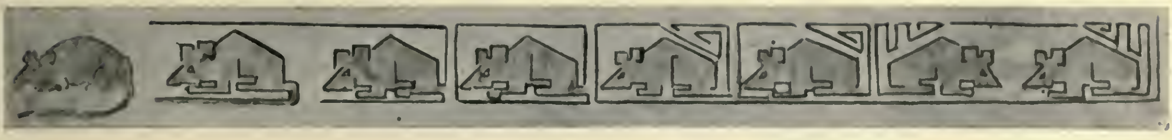
In assembling the parts and glueing them together, do not try to join all at one time. Assemble and glue the legs and panels in two pairs, squaring accurately. When these are dry, join the two pairs with the other rails and panels, squaring again carefully. The bottom should be fitted after the upright parts are dry. Unless one is sure of doing accurate work, it is better to practice first by cutting mortises and tenons in scrap pieces of wood.

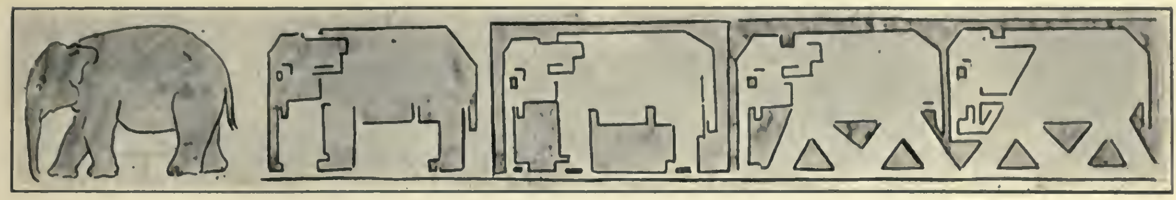
END FOR STOOL OR GARDEN SEAT-

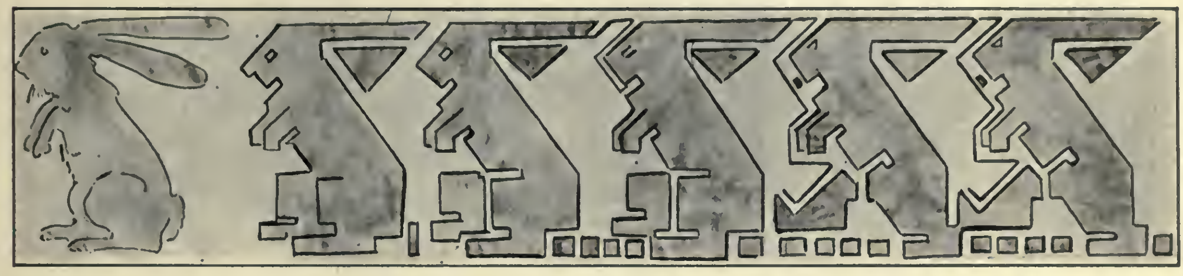


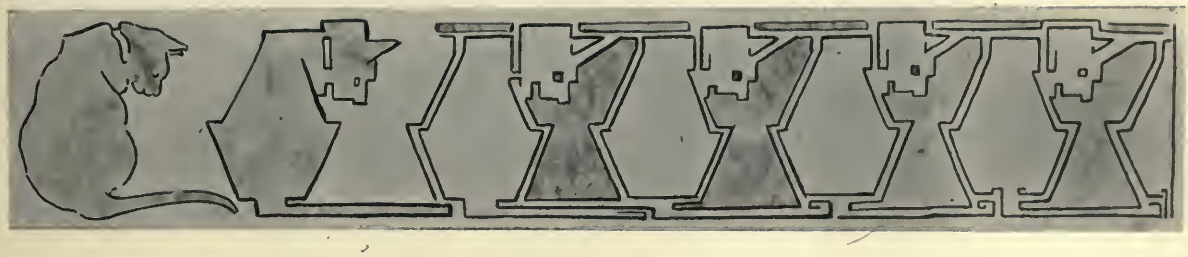
THE line drawing shows the end view of a stool or garden seat. This will admit of heavy construction. The end may be plain or carved. If made in oak, the design suggested makes an admirable piano stool.











ANIMAL DESIGNS

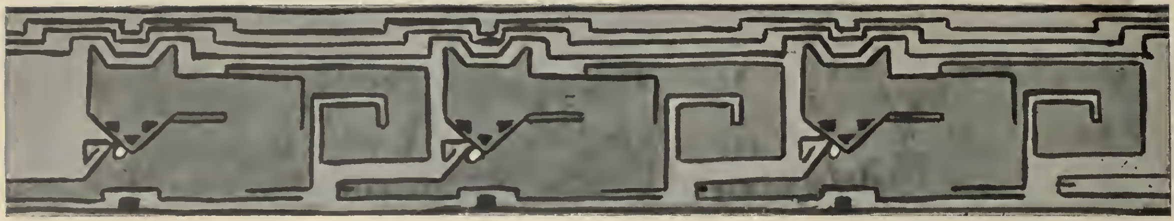
EACH animal is traced from page 46. The first squared animal in each border shows the simplest way of straightening the form over the squared paper, and each following unit shows a development in the use of lines and breaking up of spaces.

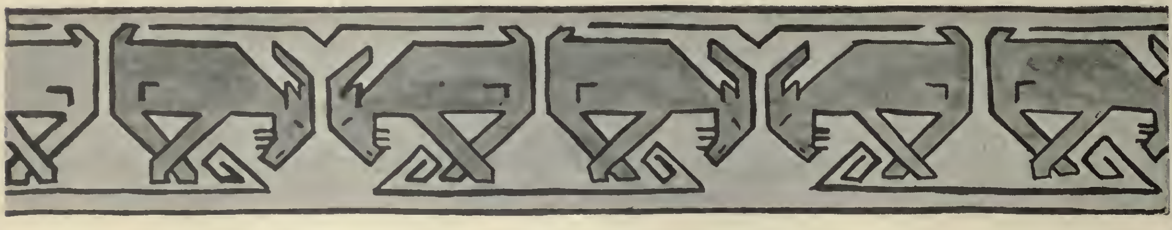
The mouse occupies so small a space, the simplest treatment is best. To make the unit more attractive, the tail is used to break the background spaces.

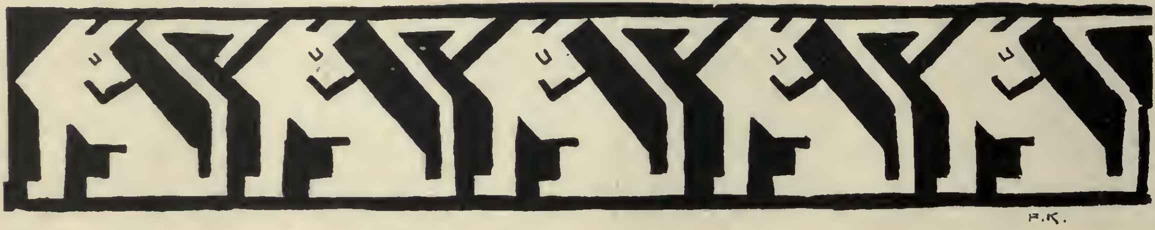
Notice how interest is given the elephant's large, solid body by making breaks into the body where the legs join, and later by giving movement to the legs and trunk.

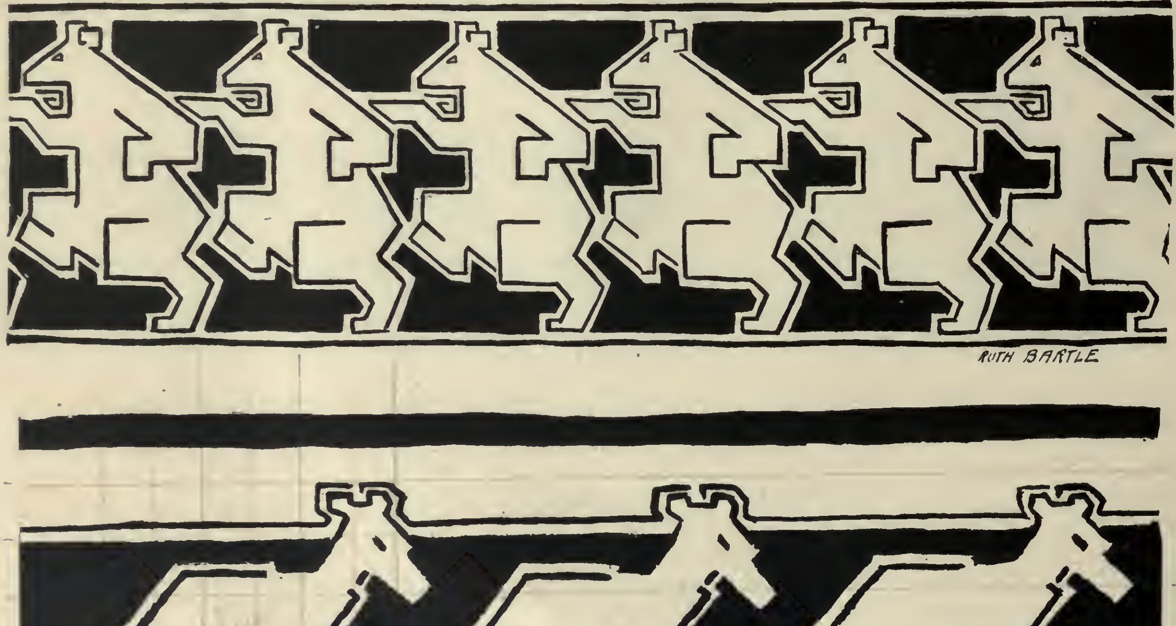
The rabbit shows how the detached legs and hanging paws suggest a combination of line and movement, which develops into action through the border.

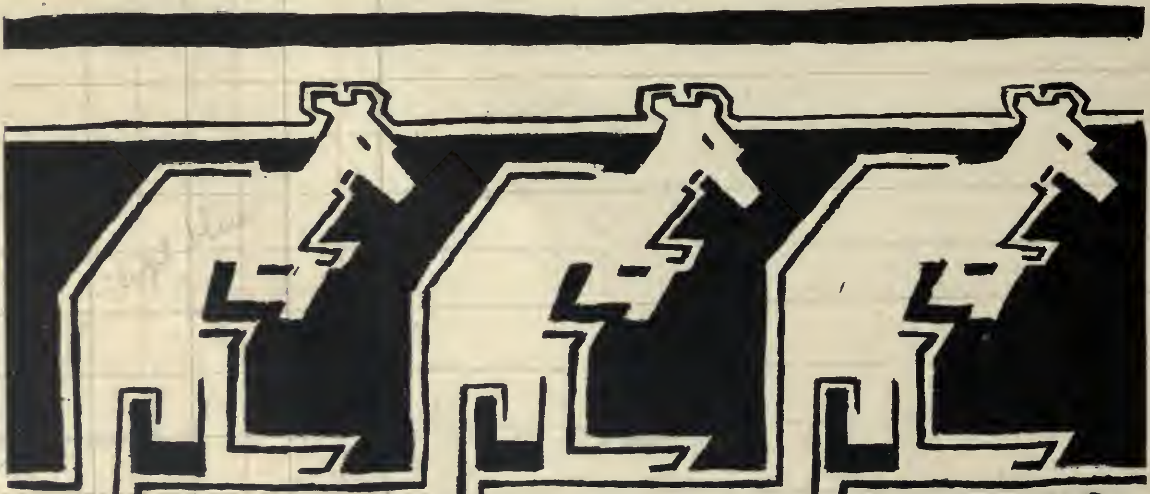
The entire change in the cat is made in the use of the lines. Follow them through and try such a development.






F.K.


RUTH BARTLE


M. HUFF-

MOUSE CLOCK

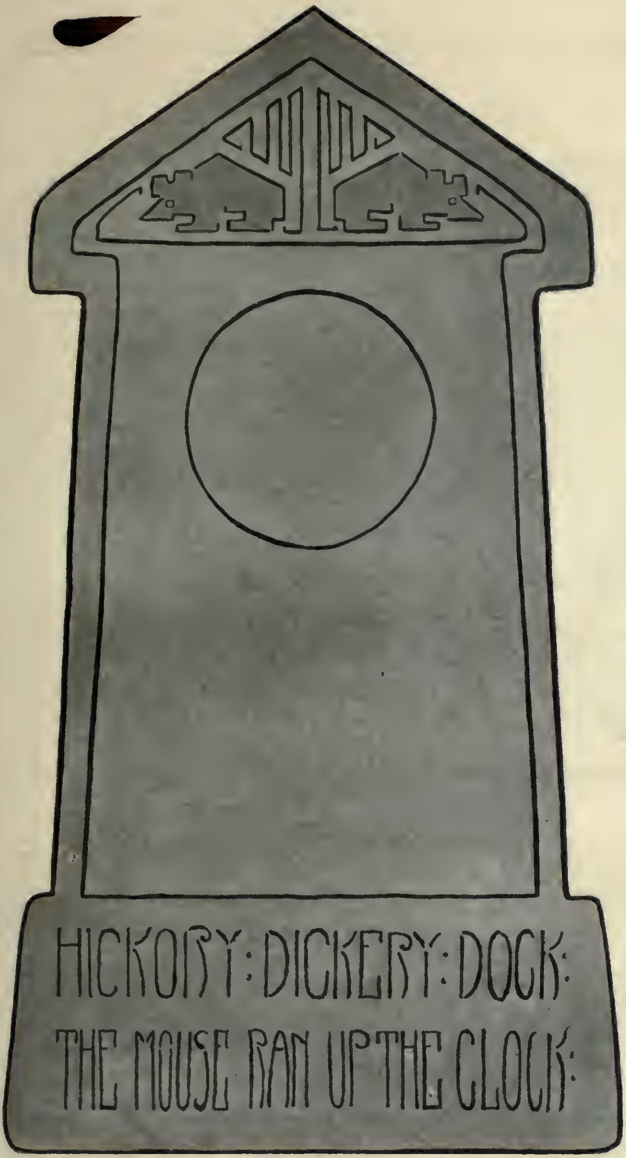
THIS is a wooden stand or box in which a clock is placed so that its face will show through the opening cut in the front. The drawing shows the front of the stand, and the circle to be cut out for a round clock face. This opening may be altered to suit the clock that will be used.

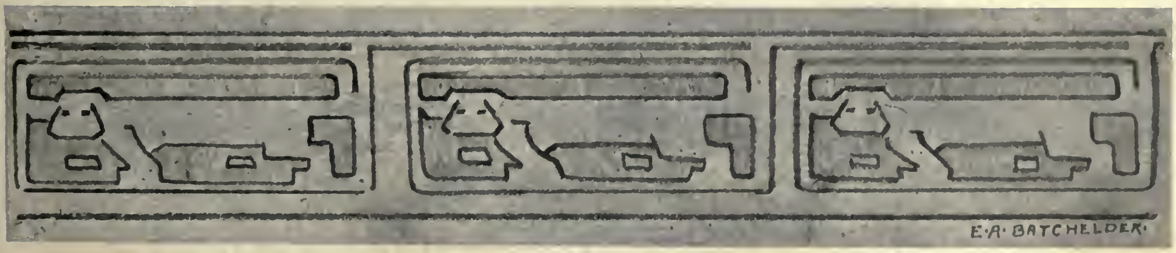
The box may be built with straight sides, and somewhat smaller than this front, so that when this is fastened to the sides of the box, it will project beyond the edges.

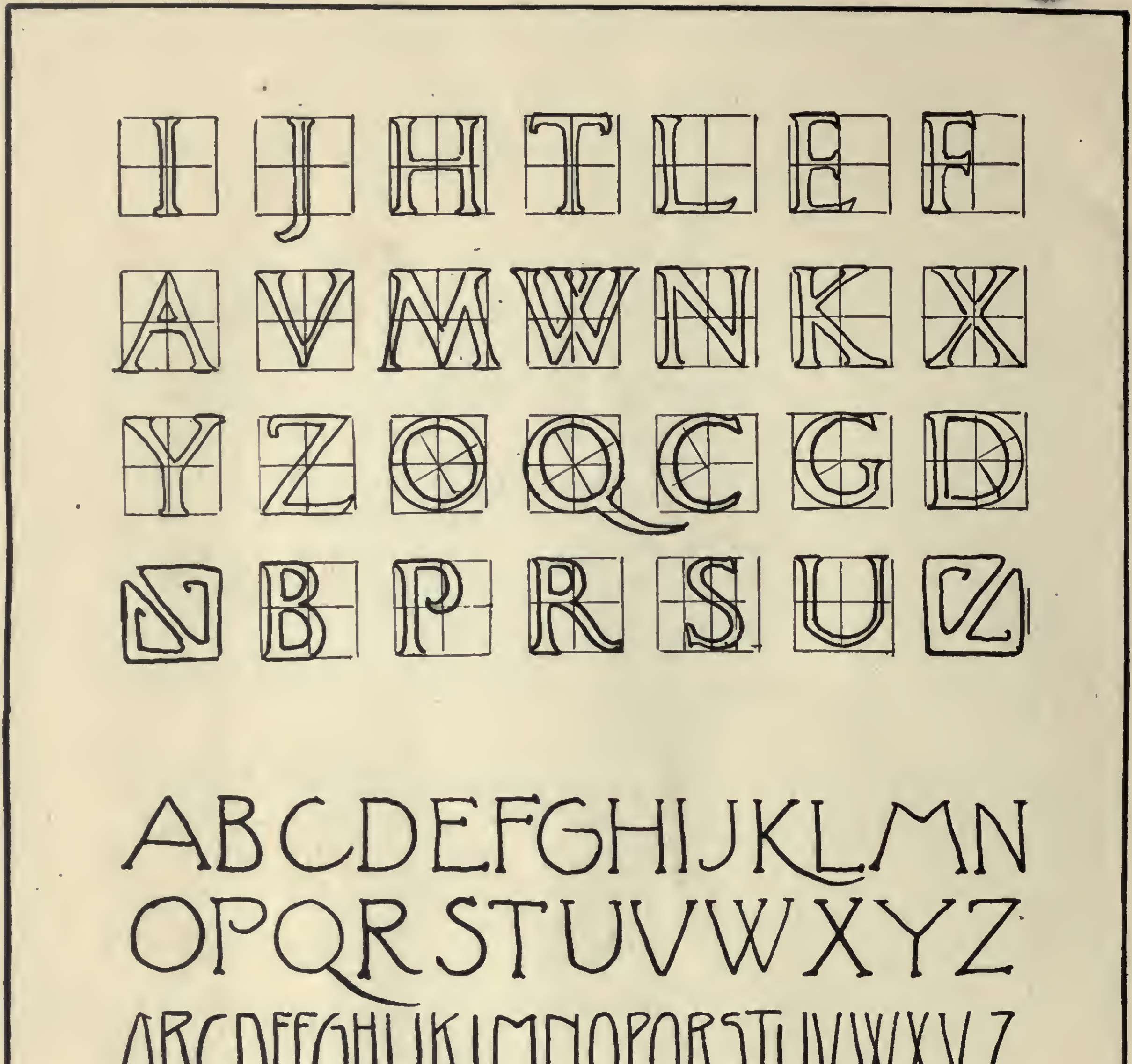
The box should have a shelf on which the clock may stand, at the right height to bring the clock face opposite the opening. The back of the box may be left open or it may be closed and a door cut in it through which to insert the clock.

The box can be built either tapering to agree with the general outline of the front, or it can be built square. If built square, make its width less than the narrowest part of the front.

The joints will all be butt joints. The back may be fastened to the front by means of dowels let well into the edges of the back pieces.






I J H T L E F
A V M W N K X
Y Z O Q C G D
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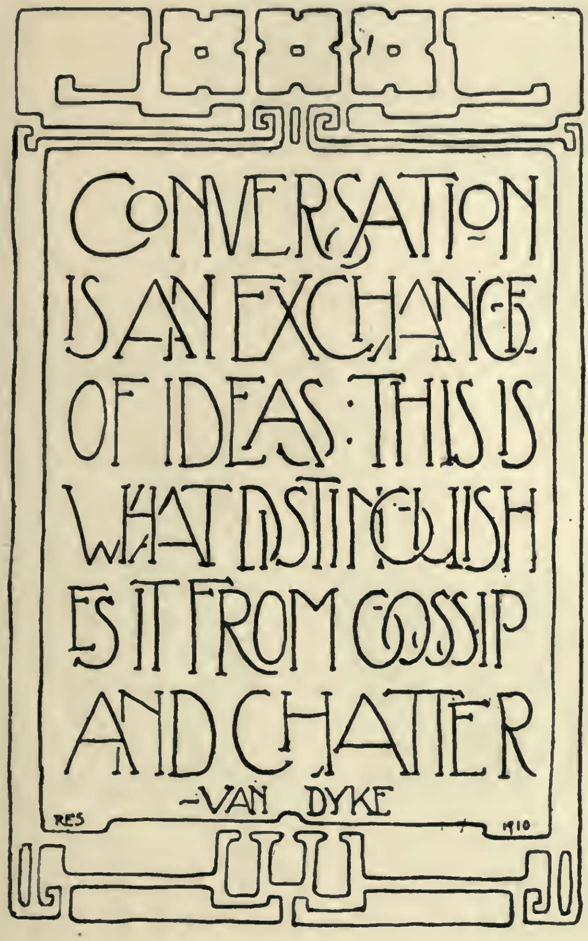
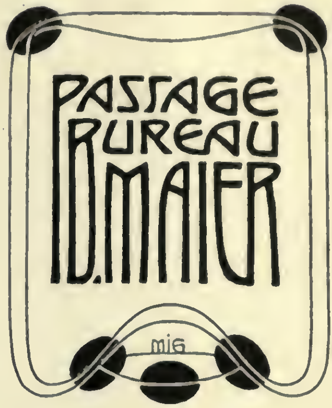
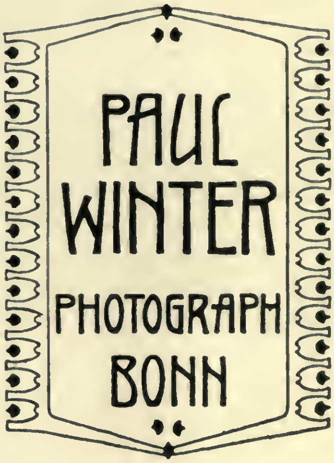
PQRSTUVWXYZ&



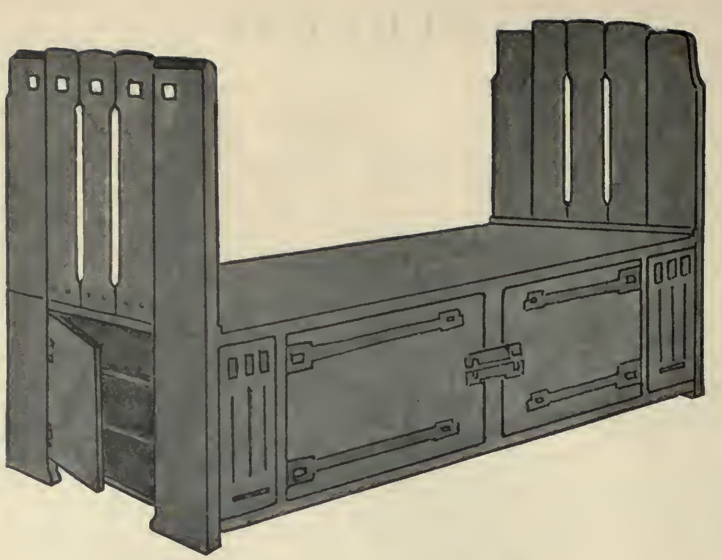


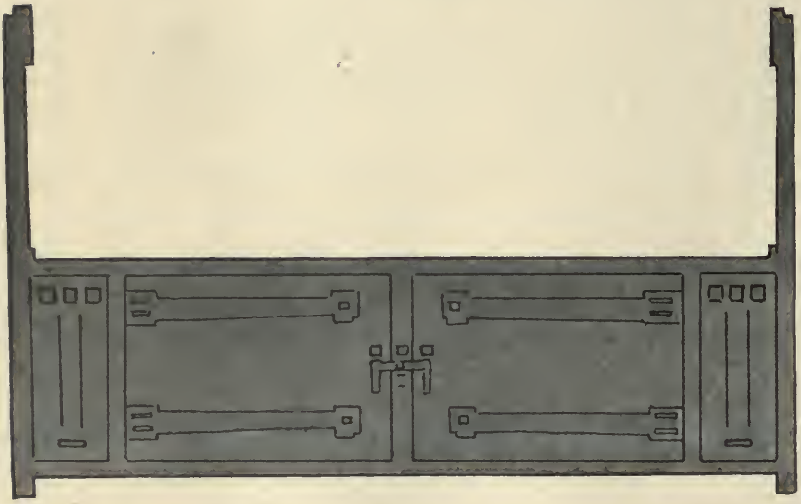


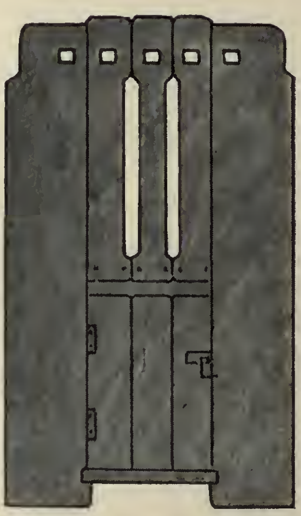
THE upper series of letters, page 50, is based on the Old Roman, commonly known as the foundation letter. The letters have been enclosed in squares so that by copying on the squared paper, the general proportions may be studied. Draw the squares about three times the given size and place in the center lines. Study the letters by sketching them free hand in pencil within the squares. The second alphabet is simply a single line Old Roman made in the same proportions as before.

In the next series the proportions have been modified. The result is single stroke, **high waisted** letters. The effect is pleasing. This form offers possibilities of combining letters to suggest a mass, just as lines and spaces may produce a mass in a design. The final alphabet is a double stroke of the **high-waisted** letter.

Note how, in the accompanying figures, the letters have been massed. While freedom has been taken with the letters, there has been a definite purpose in so doing.







SEAT

IN all seats and chairs the important structural element is sufficient bracing against end strain or side motion. As this seat has no rails to brace it, this must be secured by the end panels to which the doors are hinged, and by the back. The panels must be fitted very accurately. The jambs or uprights, to which the doors are hinged, should be mortised into both the top and bottom planks, with short tenons; and the panel boards must fit very closely on all four edges, to prevent any side or end motion of the seat.

The back of the seat, not having doors, can be used for a strong brace. Rails can be used, one above, on which the seat plank rests at the back, and one below, to which the bottom plank can be screwed or doweled. By tenoning these rails to the ends with close-fitting short tenons, the seat will be much strengthened. The space between the rails can be filled with thinner, lighter material, that sets into grooves in the rails.

The working drawing of this seat will be best made in three elevations: an end elevation, a front and back elevation. It is always easier to lay out joints and dimensions on paper than on the wood itself.

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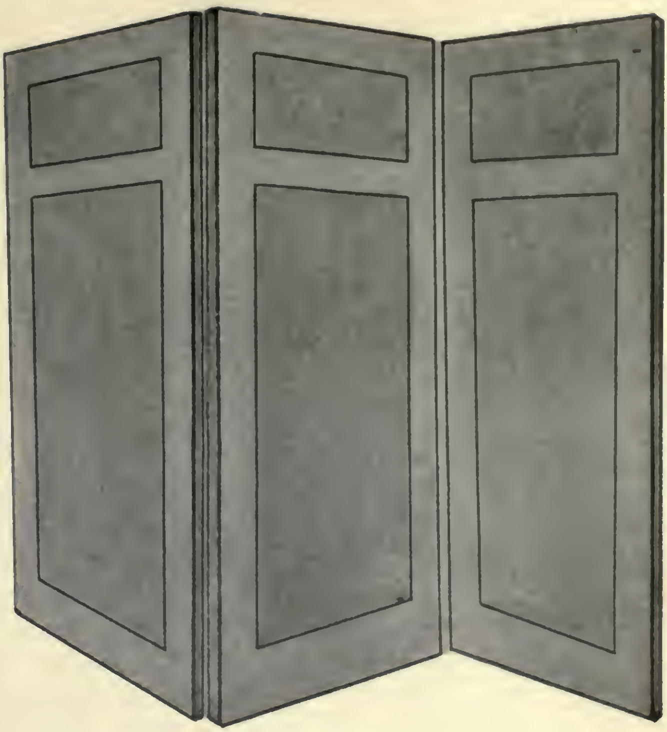
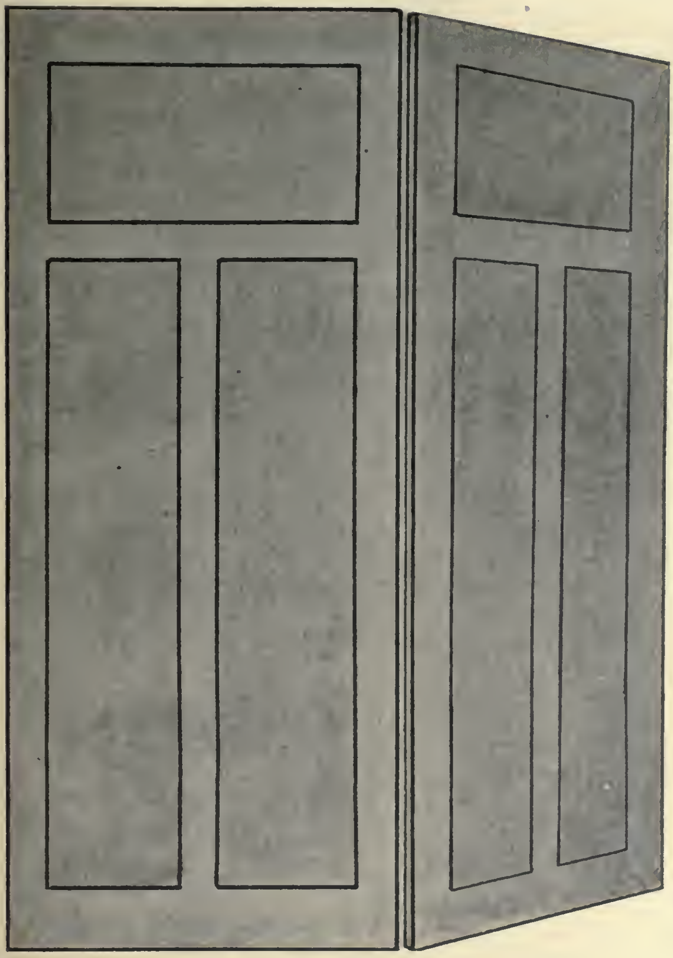
SCREENS

A RABBET may be run around the inner edges of the panels into which to tack the panelling material. It will make the back heads come flush with the faces of the framing and enable the sections to fold closely together when the screen is closed.

In stretching and tacking on the cloth, leave the corners until the last. Tack one side nearly to each end but not all the way to the ends; then tack the sides opposite in the same way, stretching the material as it is fastened down; then tack one end, and then stretch lengthways and tack the other end. Then stretch and tack the corners last of all.

The mortises should be three-eighths or one-half inch wide and the tenons cut with shoulders, and from one and one-fourth inch to one and one-half inch long (see page 6).





THESE screens are intended to be made with wooden framing and panels of burlap, denim or other light fabric, decorated by stenciling or left plain. A screen of one section can be made by putting feet on it to keep it upright. These feet should run at right angles with both sides of the frame; they should be firmly braced and long enough to support the screen against upsetting.

As the sections are alike, an elevation of one section is all that is needed for a working drawing.

The joints are all mortise and tenon joints; the rails carrying the tenons, and the styles, or upright pieces, the mortises. When there is a middle upright, or **montant**, between the rails, it should be drawn as to all its measurements in the working drawing and cut carefully, that it may fit accurately. The stock of all the framing pieces should be at least three-fourths inch thick.

349847
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